INTERNATIONAL ABSTRACT OF SURGERY

APRIL, 1921

ABSTRACTS OF CURRENT LITERATURE

GENERAL SURGERY—SURGICAL TECHNIQUE

OPERATIVE SURGERY AND TECHNIQUE

Todd, A. H.: The Technique of Re-Amputation. *Brit. J. Surg.*, 1920, viii, 88.

Re-amputation of a limb is occasionally necessary because it is impossible for the patient to wear or to be fitted with a useful artificial limb. Amputation through the juncture of the middle and lower thirds of the leg is more desirable than amputation through the lower third. Disarticulation through the elbow or the knee does not bring as good results as amputation higher up.

If a useful amount of flexion is to be retained at the joint above, an arm stump must be 10 cm. long, a forearm stump 10 cm. long, and a thigh stump from 12 to 14 cm. long. In certain cases a very short stump below a joint is actually detrimental and should therefore be sacrificed. If the knee is stiff, amputation through the tibia offers little or no advantage. Resection should be done higher up so that a hinge joint may be applied at the knee joint.

The best shape for a stump is that of a converging cone that fits snugly into the bucket and affords a wide surface over which pressure and weight-bearing may be distributed. This eliminates any necessity for end-bearing.

Pain in a stump may be subjective in origin or due to fibroneuromata, scar tissue with small nerve filaments caught up, areas of chronic periosteomyelitis, or bone proliferation with spike formation. In others a skiagram may show a sequestrum separating.

The entire stump in some cases appears to be more or less tender. The tissues are somewhat indurated and of a tough, rubber-like consistency so that it is impossible to distinguish the skin, fat, and muscles by palpation or to move them over one another. This condition is usually the outcome of a septic lesion which also explains the formation of neurofibromata seen practically only in septic cases.

No operation for the relief of pain or tenderness in an amputation stump will be wholly successful if a zone of latent sepsis is entered in the process or if there is the least tension in the coverings of the stump. In civil practice the rule that the combined length of the flaps shall equal one and one-half times the diameter of the limb at the level of bone section is not applicable since often there is considerable suppuration with consequent shrinkage and retraction. Retraction may be due also to contraction of the cut and abnormally excitable stump muscles.

The idea that short flaps can be brought down after suppuration has been cured is false. In septic cases it is best to amputate as low as possible by the flapless method, get rid of infection, and re-amputate later through normal or comparatively normal tissues; this allows a clinically aseptic course and ample stump covering, and prevents tenderness.

The author believes the attempt to drag down flaps of insufficient length by means of weight or by elastic traction is futile since a satisfactorily covered stump is not obtained in this manner. To prevent retraction and to overcome the tendency to muscular spasm, however, this means is a wise and useful procedure. If a flap is short and the stump is of sufficient length, it is best to re-amputate at a higher level. If this is not done, an ample covering for the end of the bone should be applied by means of a pedicled flap from some other part of the body such as the anterior abdominal wall. In this way a very satisfactory result can be secured.

Block excision of all the pathologic tissues involved and their removal *en masse* is the procedure of choice in re-amputation. To illustrate the technique in such cases the author assumes a case with a more or less pointed thigh stump in which the bone is inclined to protrude, the cutaneous scar is rather thick and irregular, the muscles toward the end of the stump are stretched and fibrotic, and there has been sinus formation at some preceding time. Since a tourniquet may be dispensed with, an incision is made with an ordinary scalpel through the normal skin as near the scar as possible. The incision is then deepened through the fat and superficial fascia, the scalpel being held obliquely so that it cuts in

the direction of a point 3 or 4 in. above the end of the stump. When the deeper layer of the superficial fascia is severed, the skin will usually retract easily and is pulled back forcibly all around the stump to give easy access to the field. A strong amputation knife is now swept obliquely around the muscles, both superficial and deep, down to the periosteum and up to the calculated apex of the cone to be removed. The bleeding vessels are immediately caught and the clamps removed. The main nerves are next brought down and each is carefully injected with absolute alcohol, 2 c.cm. being used for the sciatic and 1 c.cm. for all others. This expedient the author adopted six years ago and since then has not had a single case of pain from neuroma. The only precaution necessary is to be certain the whole thickness is permeated with the alcohol. The pain induced lasts not more than two days and is easily controlled by morphine. Since no disadvantage has been noted, the periosteum is cut off flush with the bone and left.

The muscles are brought together loosely over the end of the stump, and the skin, fascia, and fat are approximated edge to edge in order to secure a thin, mobile linear scar with primary union. A few mattress tension stitches of strong black fishing-gut are passed through the whole thickness of the flaps to prevent retraction of the muscles, to prevent the formation of a hæmatoma and dead-space inside the stump, and to remove all tension on the coaptation skin stitches. The skin is sewed with salmon gut and a drainage tube 3 in. long is passed in the space under the skin and secured at one angle of the wound with a stitch. A large firm dressing of plain gauze and a cotton-wool roll is applied and removed with the tube forty-eight hours later. At the end of ten or twelve days all the skin stitches are removed. The after-treatment amounts to practically nothing, but a bandage may be worn around the stump for a time. A. C. JOHNSON.

Whitman, A.: The Establishment of Surgical Principles in the Treatment of Fracture of the Neck of the Femur. *Arch. Surg.*, 1920, i, 469.

The general attitude of the medical profession toward fracture of the neck of the femur is one of discouragement and disillusionment. Whitman deplores the fact that the force of surgical tradition is to the effect that any treatment is useless. A fracture of this kind is regarded as: (1) an injury of advanced age; (2) an injury for which there is no standard treatment; and (3) an injury differing from others in that the impression is widely prevalent that an intracapsular fracture of the neck of the femur is *per se* incapable of repair.

In 1904 a proper form of treatment was described for the first time, namely the Royal Whitman abduction method. This is based on an anatomical principle and does not necessarily require the use of a plaster cast as the abduction may be obtained by means of an abduction frame. If plaster is used and has been properly applied, it should be both comfortable and strong enough to permit the patient to be freely moved about. The head of the bed should be raised to prevent hypostatic congestion and the patient may be turned on his face as well as from side to side to prevent bed sores. Movement causes no pain.

Very frequently surgeons neglect to carry out the elementary anatomical details of the method. In such cases only a small degree of abduction is obtained whereas full abduction is necessary to restore the alignment of the fractured bone. Failure may be due also to the fact that the treatment is not continued sufficiently long. Weight should not be borne on the affected limb for six months after the injury. H. J. VANDEN BERG.

Lehmann, W.: The Results of Transplantation in Medicine and the Natural Sciences (Transplantationsergebnisse aus Medizin und Naturwissenschaften). *Med. Klin.*, 1920, xvi, 474, 503, 526.

The terms "autoplastic," "homeoplastic," "heteroplastic" are familiar. The term "alloplastic" designates the grafting of dead matter into the living, while the term "parabiosis" is applied to the union of two organisms. By "explantation," on the other hand, is meant the growth of living tissue *in vitro*, in blood serum or lymph. Experimentation with the latter has been of fundamental importance leading to an understanding of the transplantation of tissues. Also of importance is experimentation with botanical transplants, although the laws governing the transplantation of animal tissues are unlike those governing transplantation in plant life.

According to some experimenters certain organs are more compatible than others; for example, the thyroid and bone, and the testicle and lymph glands. Other factors which must be taken into consideration are proper nutrition and the sensitivity of certain tissues to cold, infection, and careless handling. Connective tissue has been found more resistant than epithelial tissue.

The results obtained with homeoplastic grafts are remarkable at first, but sooner or later necrosis sets in. Christiani's experiments with various transplants of genital organs in rats over a period of five years, however, are important. Steinach succeeded in "femininizing" man, and "masculinizing" woman. The failure of homeoplastic and heteroplastic grafts is now explained on the basis of immunization and lack of sufficient nutrition.

Axhausen found that autoplastic bone grafts are mostly absorbed, but that new bone is formed by the medullary contents and the periosteum. Connective tissue, thyroid, testicle, ovary, and various other organs have been successfully transplanted. Autoplastic grafting of skin, fat, and fascia has been successful. Successful heteroplastic grafting of bone and other tissues has also been reported. The fate of the transplant is not to be decided from the reported improvement in the clinical symptoms, however, for this may be due to glandular extracts introduced into the body.

Plange transplanted corneal tissue with success. The patient had lost his vision following an injury inflicted by slaked lime. After the transplantation he was able to distinguish objects at short range.

E. SCHULTZE (Z).

ANÆSTHESIA

Burmeister, C. H.: General Anæsthetics for Intra-Oral Operations. *Am. J. Surg.*, 1920, xxxiv, Anæs. Supp., 114.

The choice of anæsthetic for intra-oral surgery depends primarily upon the patient's physical condition and secondarily upon the skill of the anæsthetist. Chloroform produces a good anæsthesia for mouth work, but the attendant high mortality and frequent postoperative complications contraindicate its use.

Nitrous oxide-oxygen and ether, alone or in combination, are the anæsthetics of choice. Nitrous oxide-oxygen used with the nasal inhaler is ideal for short operations. In long operations, especially when the nasal fossæ or antrum are opened, it is necessary to use ether with the gas. This is best administered by means of the ether attachment on the gas machine. For resection of the jaw, removal of large cysts of the ramus, resection of nerves, and any operation involving the tongue, the author prefers ether vapor given by the intrapharyngeal method.

For any operation in the mouth, including the extraction of teeth, in which a general anæsthetic is indicated, the dental chair should be replaced by an operating table. While dentists have given nitrous oxide many thousands of times without subjecting the patient to a previous physical examination or determining the blood pressure, this fact merely proves the safety of the anæsthetic and does not justify the practice. The heart, lungs, and urine should be examined in every instance. The preparation of a patient for oral surgery should be the same as for any operation in which a general anæsthetic is administered.

No dentist or surgeon should act as both anæsthetist and operator, and he who does so is not assuring his patient the maximum of safety. A dentist giving nitrous oxide-oxygen for an extraction cannot give his undivided attention to the operation. When complications due to poor administration of the anæsthetic arise during an operation, the operation is generally a failure.

ISABELLA C. HERB.

SURGERY OF THE HEAD AND NECK

HEAD

Kopetzky, S. J.: Report of Six Unusual Cases of Septic Sinus Thrombosis in Children; Operations; One Death. *Laryngoscope*, 1920, xxx, 763.

In Case 1 the sinus thrombosis involved the jugular bulb and there was pain over the frontal sinus due to pressure of enlarged glands upon the temporo-auricular nerve. Repeated blood cultures were negative. Operation was followed by recovery.

In Case 2 the sinus thrombosis followed acute mastoiditis in a patient suffering from chronic endocarditis. Operation resulted in recovery.

In Case 3 an extensive sinus thrombosis extended backward beyond the knee of the lateral sinus. The temperature was atypical and a positive blood culture was obtained. Operation was followed at first by bilateral facial œdema but ultimately by recovery.

In Case 4 a primary jugular bulb thrombosis presented symptoms suggesting extension toward the cavernous sinus. Streptococcus viridans was present in the blood. Recovery followed operation.

In Case 5 a primary jugular bulb thrombosis followed a painless type of mastoiditis. Sepsis was present but the symptoms of mastoiditis were absent. The blood-culture findings were positive. The neurological findings following the operation were unusual. Death resulted.

In Case 6 a lateral sinus thrombosis involved the jugular bulb. Mastoiditis was bilateral and of a painless type. A secondary operation on the bulb was performed. Temporary facial paralysis set in Following operation otitic sepsis with abscess formation in the muscles developed. Pulmonary and abdominal symptoms were also noted. Blood transfusion was given. The patient recovered.

Kopetzky gives the histories and describes the operations and findings in these 6 cases in detail, and summarizes his conclusions as follows:

1. The painless type of mastoiditis is a source of potential danger because its gravity is not recognized and it is often not diagnosed.

2. In cases of otitis of more than two weeks' duration which present a picture of sepsis otherwise unaccounted for, the possibility of sinus thrombosis should be borne in mind and blood cultures should be made.

3. When cultures of the blood are repeatedly negative the clinical signs should govern treatment. Exploration of the mastoid process and eventually exploration of the sinus should be undertaken before a fatal type of otitic sepsis or a meningitis develops.

4. The mastoiditis which accompanies primary jugular bulb thrombosis is often negligible as to marked classical symptoms and extent of the lesion.

5. A more general knowledge of the various types of mastoiditis is desirable as all types should not be treated alike. Some present graver risks than others.

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6. The findings at operation should be carefully studied as a hæmorrhagic lesion accompanying or following an attack of influenza and giving rise to

septic symptoms makes a survey of the sinus condition imperative as soon as the necessary data to establish the diagnosis are at hand.

E. C. ROBITSHEK.

Perera, A.: The Indications, Contra-Indications, Methods of Choice, and Results of Hypophysectomy (La hipofisectomia; indicaciones, contra-indicaciones, métodos, su eleccion, resultados). *Med. Ibera.*, 1920, xii, 376.

In the author's opinion the fronto-orbital route is to be preferred in the removal of a tumor of the hypophysis. This gives an aseptic and an ample operative field and does not necessitate any decided dislocation of the cerebral lobe. The œdema of the eyelids which develops is temporary, and if the eyeball must be displaced temporarily it is not a very grave inconvenience. A good cosmetic result is obtained with careful technique. If the neoplasm is situated primarily on the sella turcica the intracranial route is best.

W. A. BRENNAN.

Strachauer, A. C.: The Surgical Treatment of Cerebral Hæmorrhage in the New-Born. *Minnesota Med.*, 1920, iii, 577.

Prolonged coagulation and bleeding times call for the injection or transfusion of blood. Repetition of such treatment should depend upon the blood findings. In cases of slow bleeding one transfusion may be sufficient. The shortening of the coagulation and bleeding times in cases of severe hæmorrhage is absolutely essential to successful surgical intervention.

In infratentorial cases spinal puncture or punctures may be performed. As much as from 60 to 80 c.cm. of blood may be removed at a time. The tenseness of the fontanella then subsides and the symptoms are immediately relieved. In cases of supratentorial hæmorrhage immediate craniotomy is indicated. This may consist of a decompressive operation or an osteoplastic craniotomy with the removal of the blood. In view of the fact that the hæmorrhage is on the surface of the brain rather than into its substance, a simple decompressive craniotomy without disturbance of the clot may at times suffice, or in very grave cases may be performed preliminary to a later operation for the removal of the blood.

In the presence of focal symptoms, the site of the craniotomy may be anatomically determined. In the absence of such localizing data a single or double subtemporal decompression may be performed.

To locate the site of the hæmorrhage the following procedure is recommended.

Through a 1 in. muscle-separating exposure through the temporal muscle a small button-shaped fragment is removed from the parietal bone. If the blood cannot be seen through the dura, a ⅛ in. or ¼ in. incision through the exposed dura will be sufficient to show the presence or absence of blood. If blood is present, an osteoplastic craniotomy may be performed. If it is absent, a second trephine exploration may be performed on the opposite side.

The surgical treatment for cerebral hæmorrhage should be instituted early, preferably during the first weeks of life. Operations for the late sequelæ are rarely indicated.

In four craniotomies for cerebral hæmorrhage performed on infants upon the second, fourth, fifth, and seventh days of life respectively, there were no deaths due to the operation but one child died eight weeks later. The hæmorrhage in the latter case was probably intraventricular. An autopsy could not be obtained. In the remaining three cases prompt relief was given and the children are reported to be seemingly normal.

E. L. CORNELL.

Coughlin, W. T.: Immobilization of the Proximal Fragment in Fracture of the Jaw Above the Angle. *Surg., Gynec. & Obst.*, 1920, xxxi, 574.

For the procedure described only local anæsthesia is necessary. After anæsthetization of the area, one who is not quite sure of the anatomy would do well to locate the depth and position of the coronoid by sounding with a needle. The incision should be parallel to the fibers of the facial nerve and extend only through the skin. The upper one-quarter should overlie the zygoma, the remainder extending to a point from ½ to ¾ in. below it. It should not be more than 1 in. in length.

A needle or probe is passed close to the zygoma, down through the masseteric fascia and the masseter muscle until the coronoid is felt. A closed scissor is passed alongside this probe until the point rests against the coronoid. The probe is then withdrawn and, the point of the closed scissors being pressed firmly against the coronoid, the scissors are opened and the fibers of the masseter are split from the zygomatic border downward for an inch.

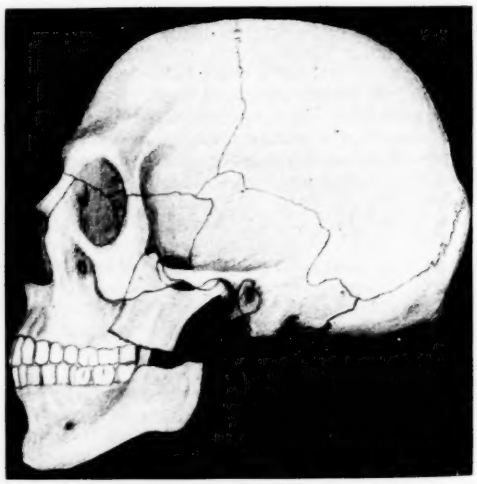

Fig. 1. The proximal fragment is drawn forward by the pull of the temporal muscle, etc.

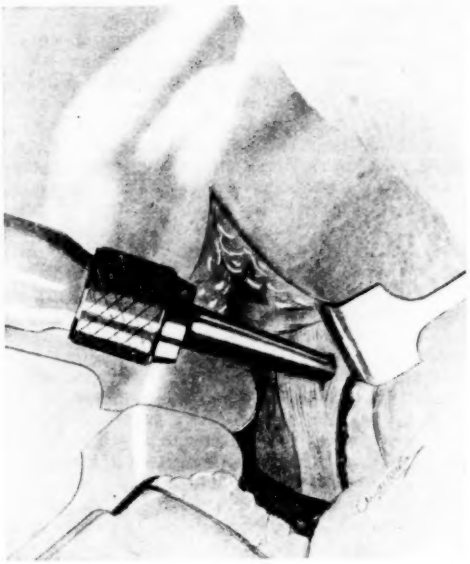

Fig. 2. The fragment is held in reduction while a hole is drilled through the coronoid just below the zygoma.

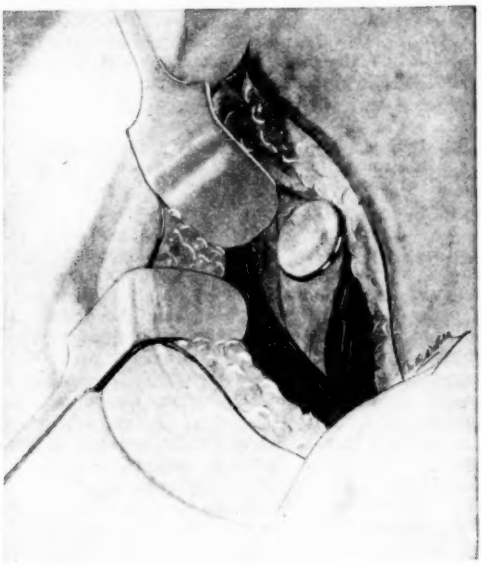

Fig. 3. The nail is passed straight in through the hole until its head impinges on the outer surface of the zygoma.

(Immobilization of the Proximal Fragment in Fracture of the Jaw Above the Angle.—W. Coughlin)

An assistant passes his finger into the mouth and makes reduction. He then holds the fragment reduced while a hole is being drilled and a nail is passed. The hole is drilled through the tip of the coronoid as close to the edge of the zygoma as possible.

The nail used is an ordinary wire nail with a thin flat head and about 1½ in. long. It is passed straight in until its head impinges on the outer surface of the zygoma. When it is properly passed, it effectively prevents the coronoid from rising as it catches at one end under the zygoma and its point comes into contact with the base of the skull. The wound is closed with a figure-of-8 silkworm-gut suture through the masseteric edges and overlying structures.

The jaw is then immobilized. For this kind of fracture the author uses a "closed bite."

The nail is removed after four weeks and comes away very easily. H. A. McKnight.

NECK

Coudray, G.: Wounds of the Common Carotid and Their Treatment by Ligation (Considérations sur les plaies de la carotide primitive et leur traitement par la ligature). *Presse méd.*, Par., 1920, xxviii, 886.

Wounds of the common carotid in war are almost always immediately fatal either because of the severe hæmorrhage or because of shock.

The author ligated the artery in 3 cases of wounds of this type. Two of the patients recovered. The third case was that of a man who, with help, walked about 100 meters immediately after the injury although an immense jet of blood issued from the wound. Operation was performed at once but death occurred two hours later as the result of the hæmorrhage. The two men who survived had been transported several kilometers before they were operated upon, the smallness of the projectile orifice and the formation of a hæmatoma making this possible.

Ligation of the common carotid may be done below or at the side of the bifurcation. The cranial circulation is re-established by numerous anastomoses effected by the internal and external carotids, etc.

Prior to the recent war the majority of surgeons considered that an associated injury to the internal jugular aggravated an injury of the arterial trunk and increased the risk of gangrene. Experience gained during the war has changed this opinion and many surgeons now recommend ligation of the internal jugular with the artery even if it is normal. In the limbs the ligation of veins diminishes the risks of gangrene.

Coudray believes that ligation of the internal jugular, instead of increasing the frequency of cerebral complications caused by ligation of the common carotid, diminishes the risk of hemiplegia.

It is evident from the reports published that cases in which recovery took place without accident were almost all cases in which both the vein and the artery were injured and ligated.

W. A. BRENNAN.

Roux-Berger, J. L.: The Surgical Excision of Malignant Tumors of the Carotid Region (L'exérèse chirurgicale des tumeurs malignes de la région carotidienne). *Presse méd.*, Par., 1920, xxviii, 827.

The malignant growths of the carotid region most commonly encountered are the branchial tumors. The latter, however, and the secondary growths following an epithelioma of the mouth or pharynx are relatively rare. The success of surgical treatment depends on the extent of the growth, the small and movable type of tumor being more favorable as frequently it may be removed in its entirety.

The malignant branchial tumors usually respond very poorly to X-ray and radium treatment. The effect of the rays on the secondary cancerous adenopathies depends on the histologic nature of the growth; some are sensitive and some resistent to the rays. The radio-resistent tumors should be removed if possible and X-ray or radium treatment then instituted. The introduction of radium needles into small tumors is associated with the risk of injury to the jugular vein. In the cases of large tumors this danger is very slight.

The operability of malignant tumors of the carotid is not always easy to determine. Complete fixation is usually due to invasion of the surrounding tissues and complete extirpation is almost impossible. In the submaxillary and upper cervical regions the tumor is sometimes fixed to the horizontal ramus of the mandible. Complete extirpation in these cases is very difficult and the wound should be exposed to large doses of the X-ray or radium.

In removing malignant tumors of the carotid there is always danger of injuring the internal jugular vein. The tumor is sometimes adherent to the jugular and unless it is removed there is grave danger of leaving tumor cells in the wound. It is often difficult to determine whether or not the tumor is adherent to the jugular, in which case the best procedure is excision of the sternomastoid, the jugular vein, and the tumor in one mass. The growth is thus removed with a portion of the normal tissue surrounding it and the possibility of recurrence is reduced to a minimum. Very little functional disturbance has resulted from the removal of the sternomastoid and the internal jugular vein.

The skin incision is large enough to permit good exposure of the tissues. The sternomastoid is divided at its lower end a short distance above the clavicle, the fascial layers are cut through, and the internal jugular vein is ligated. The whole mass, including the tumor, is then freed from the deeper tissues. This is done by ligating the branches of the jugular vein and by blunt dissection of the main vein from the carotid artery by means of the fingers. When the upper pole is reached, the muscle, fascia, and vein are sectioned and the mass is removed. The skin is then sutured, and if the tumor is ulcerated, drainage is instituted because of the danger of infection.

FRENCH K. HANSEL.

SURGERY OF THE CHEST

CHEST WALL AND BREAST

DuBray, E. S., and Rosson, F. B.: Primary Mesothelioma of the Pleura; A Clinical and Pathologic Contribution to Pleural Malignancy, with Report of a Case. *Arch. Int. Med.*, 1920, xxvi, 715.

DuBray and Rosson present a report of their study of pleural malignancy. They give a classification of pleural tumors advocated by Guyot and Parcelier and then describe a case in detail, taking up the symptoms, course, physical signs, diagnosis, cytodiagnosis, the chemistry of pleural effusions in the diagnosis of malignancy, and the differential diagnosis of pleural growths.

Thirteen cardinal points are made in the paper:

1. Primary malignant pleural tumors are very rare.

2. These tumors constitute a distinct group and present a rather constant pathologic picture.

3. The definite point of origin has not been determined absolutely.

4. It is probable that these tumors are of mesothelial origin and should be designated as "mesotheliomata" rather than "carcinomata," notwithstanding the fact that most of them have been reported under the term "endothelioma."

5. In the case presented the clinical diagnosis of malignant pleural disease was substantiated by the necropsy findings.

6. Pain in the chest is the earliest and most significant single symptom. It is usually severe and persistent in character and presents the most distressing feature of the disease.

7. The clinical course is of comparatively short duration and is usually afebrile.

8. There is nothing pathognomonic in the physical signs of the disease. A persistent, rapidly re-accumulating, hæmorrhagic pleural fluid is suggestive, and when noted, the possibility of a pleural new-growth should be borne in mind.

9. The clinical picture studied as a whole offers the most valuable and trustworthy evidence.

10. The roentgen-ray examination fails to reveal the exact nature and the site of origin of the disease process in pleural malignancy.

11. Cytodiagnosis and the chemical study of the pleural transudates are of very limited value.

12. When an exhaustive study has failed to establish a diagnosis and pleural malignant disease is suspected, an exploratory thoracotomy is justifiable.

13. The two most important and difficult diseases to exclude in the differential diagnosis are pulmonary tuberculosis with hæmorrhagic pleural effusion and primary malignant disease of the lung or bronchus. A. R. HOLLENDER.

Heekes, J. W.: Surgical Emphysema after a Blow on the Neck. *Brit. M. J.*, 1920, ii, 936.

The patient, a small girl, fell from a short ladder and struck the anterior portion of her neck on a fence a few feet below. No pain was felt except at the site of the impact. Within fifteen minutes the neck began to swell and breathing became difficult. One hour later the entire body was enormously ballooned with surgical emphysema, the skin was intensely reddened, and laryngeal obstruction was evident. An immediate tracheotomy relieved the asphyxia. The patient felt comfortable the following day and the emphysema gradually disappeared, beginning at the extremities. The tracheotomy tube was removed the fourth day and the child left the hospital three weeks after the date of admission.

The point in the respiratory tract from which the air was escaping into the tissues could not be definitely located. A careful physical examination revealed no evidence of pneumothorax, a fracture, a wound, or a bruise which would explain the condition. It is thought the fall occurred in such a manner that the trachea was suddenly pulled upward and that in this way a rent was produced in its lower portion or in one of the bronchi. Tracheotomy was made necessary by occlusion of the larynx caused by the intense emphysema of the cervical tissues. This operation allowed the traumatic opening in the respiratory tract to heal.

T. D. MOORE.

Porter, M. F.: Tumors of the Breast; Based on a Study of 77 Cases Personally Observed. *Surg., Gynec. & Obst.*, 1920, xxxi, 584.

Of the 77 cases reviewed, 49 were malignant and 28 benign. The diagnosis was confirmed by laboratory examination in all but 2 cases, those of males who were found to have benign tumors. No composite tumors or sarcomata were found. Scirrhous carcinoma was the most common type. The youngest patient was an unmarried girl 17 years of age. In this case the breast was removed eleven years ago. The patient married and is now living. The oldest patient was 71 years of age. In this case also the tumor was a scirrhous carcinoma. Six years after operation it recurred and death resulted later from metastasis in the stomach. In 11 cases there was, in addition to the tumor, a depression of the nipple, ulcer of the skin, or leakage of the nipples. In 2 cases, one malignant and one benign, the only sign of trouble was leaking nipples. The character of the discharge does not indicate the nature of the condition but locates it within the duct. Of 33 women who had nursed children, 25 had cancer, while of 42 who had not nursed children the condition developed in only 19. The married state increases the incidence of cancer of the breast only because it increases the incidence of pregnancy. When the laboratory and clinical findings are in conflict the author is guided by the latter.

In 9 of the cases reviewed only the tumor was excised; in 12, only the breast was removed; and in 56 a radical operation was done. The shortest time before a physician was consulted after the condition was first noticed was four days; the longest, thirty-four years. The latter was the case of a woman who stated that she had had a lump in the breast ever since an abscess was lanced. The axillary glands were involved. A radical operation was followed by local recurrence in three years. A second operation was then performed and the patient is now well after three years, but has an irritating skin disease of the arm. Four patients had associated maladies. There was no operative mortality.

In the malignant cases a five-year cure was obtained in 27.2 per cent and a three-year cure in 13.6 per cent. Three patients died of metastasis in the brain. All of the patients with benign tumors were cured except one who reports that she has had a lump in the axilla for six months. The author has not seen her, but assumes that the diagnosis was incorrect.

Logic, animal experiments, and personal experience uphold the opinion that heredity plays a significant part in cancer. In early cases in which the condition is circumscribed, such as probably belong in MacCarty's secondary cytoplasia group, removal of the breast is all that is necessary. Whether radical or not, the type of operation should be made to fit the case—not the case made to fit a particular type of operation. The operative results are improving as patients are consulting the surgeon earlier. This is due in large measure to the work of the American Society for the Control of Cancer. This society should have the hearty support of the profession.

TRACHEA AND LUNGS

Carisi, G.: A Case of Primary Lymphosarcoma of the Right Lung (Un caso di linfosarcoma primitive del polmone destro). *Riforma med.*, 1920, xxxvi, 1124.

Primary lymphosarcoma of the lung is not frequently seen in medical practice. The author reports the case of a man 21 years of age who entered the hospital with the diagnosis of empyema. His illness began about three months before with a dry cough. Later there was yellowish purulent sputum. Complaint was made of loss of weight, lancinating pain at the base of the right lung which radiated to the epigastrium, and diffuse œdema of the right chest wall.

Exploratory punctures being negative, the author diagnosed the condition as a neoformation primary

in the lower half of the right hemithorax. He was uncertain, however, whether this growth was a sarcoma or a carcinoma. Death resulted in a short time. The autopsy showed that the tumor was a pulmonary sarcoma the size of a fœtal head in the lower lobe. The right lung was free but the glands of the right hilum were invaded. On microscopic examination the tumor was found to be a round-celled polynuclear lymphosarcoma. Sarcoma was not discovered in any other organ.

W. A. BRENNAN.

PHARYNX AND ŒSOPHAGUS

Austoni, A.: A Further Contribution to the Treatment of Severe Cicatricial Stenoses of the Œsophagus (Ulteriore contributo all' indirizzo di cura delle stenose cicatriziale di alto grado dell' esophago). *Arch. ital. di chir.*, 1920, ii, 435.

A short time ago Austoni reported the favorable results obtained in 4 cases of severe cicatricial stenosis of the œsophagus by means of progressive dilatation. On the basis of these and several new cases which he has treated he arrives at the following conclusions:

1. Cases of erosion by caustics should be seen by a surgeon at once because of the more or less immediate consequences of the destructive lesions in the œsophageal walls.

2. When the destructive lesion of the walls is extensive and deep, immediate intubation is indicated in order to prevent the formation of a severe stenosis by cicatricial retraction. For this intubation the retrograde route should be employed.

3. An early operation is always indicated in cicatricial stenosis as the probability that good results will be obtained is greater when the cicatricial tissue is newly formed.

4. Absolutely impermeable cicatricial œsophageal stenoses are extremely rare. All stenoses which are permeable by even a very fine sound, however old, may always be cured by dilatation. While this procedure is associated with minor dangers, it is more successful than any other.

5. The first step in the dilating process consists of the passage of a bougie to prepare the way and serve as a guide for further manœuvres. This bougie may be passed by way of the mouth or by the retrograde route through a gastric fistula. The first route is recommended for cases of stenosis situated in the cervical and upper thoracic tracts; the second, for those in which the stenosis is not easily reached from above without difficulty and danger.

6. Œsophagoscopy is of the greatest value in facilitating intubation. The methods usually employed to overcome urethral strictures are also of value. Gastric endoscopy with indirect vision is recommended for retrograde intubation. The discovery of the cardia will be facilitated if the patient swallows during the examination or ingests a little milk.

7. The best method of treating cicatricial œsophageal stenosis is progressive dilatation by repeated intubations or the insertion of a sound for one or two hours either through the mouth with the aid of the œsophagoscope or by the retrograde route with the aid of a guiding thread.

8. The duration of the treatment depends upon the degree, extent, and age of the stenosis and is shorter when the stenosis is recent. In cases of long-standing and great severity treatment is usually necessary for about four months. The dilatation should then be repeated monthly for a year.

9. The hypodermic injection of fibrolysin facilitates the treatment and hastens recovery.

W. A. BRENNAN.

SURGERY OF THE ABDOMEN

ABDOMINAL WALL AND PERITONEUM

Svartz, N., and Hansen, R.: Diffuse Purulent Peritonitis without Perforation in Typhoid Fever (Péritonite purulente diffuse sans perforation dans la fièvre typhoide). *Acta med. Scand.*, 1920, liv, 97.

In the case reported the purulent peritonitis was due to propagation of the inflammation through the intestinal walls without penetration of infected material into the abdominal cavity. This was evident from the absence of intestinal perforation, the fact that at operation no free gas was found in the abdomen, the exudate did not contain colon bacilli, the ileum showed inflammatory changes, and typhoid bacilli were found in the exudate from the ileum.

Between 40 to 50 cases of peritonitis caused by propagation have been reported in the literature. A little less than one-third were cases of fibrinous peritonitis. Ten were purulent cases and the remainder cases of serofibrinous peritonitis. Twenty-five per cent of the patients recovered after operation. In 4 cases the presence of the typhoid bacillus in the exudate was demonstrated.

The authors' patient was a woman 26 years of age. On the thirty-fourth day of her illness she was operated upon for a supposed intestinal perforation due to typhoid fever. Twenty-five days after the first operation a second operation was done to drain a subphrenic abscess. Death occurred about seven weeks later from bronchopneumonia.

W. A. BRENNAN.

Andrews, E. A.: Large Strangulated Umbilical Hernia. *Surg. Clin. Chicago*, 1920, iv, 1247.

The author describes briefly a case of sudden strangulation of an umbilical hernia which had been present for fifteen years without producing symptoms. The patient, an extremely obese colored

woman 45 years of age, was apparently suffering acute pain and in a marked degree of shock with a temperature of 100 degrees F., pulse 120, and respiration, 30, short and catchy. The operation revealed a multilocular sac. The adherent omentum was resected and the hernia closed. Recovery followed.

The author describes the operation and discusses the after-treatment of patients who are markedly obese. E. C. ROBITSHEK.

GASTRO-INTESTINAL TRACT

Kelling, G.: The Treatment of Dangerous Gastro-Intestinal Hæmorrhage (Beitrag zur Behandlung lebensgefaehrlicher Magendarmblutungen). *Muenchen. med. Wchnschr.*, 1920, lxvii, 1198.

In the author's opinion the prognosis of severe gastro-intestinal hæmorrhage is too often regarded as favorable. Hæmorrhage from a callous ulcer is especially dangerous because the large eroded vessels cannot contract. In the author's cases the mortality was 12 per cent. Kelling believes that one-third of callous ulcers may be diagnosed by palpation. Other factors aiding in the diagnosis are advanced age, a history of long-standing ailment, and poor nutrition.

As in all other types of hæmorrhage, men are in greater danger than women. If a callous ulcer is palpable the prognosis as regards hæmorrhage depends also upon whether it is movable or not. If it is movable it is probably not adherent to neighboring organs and the prognosis is more favorable. The prospect of cure is better also when the ulcer is situated in the pylorus or duodenum rather than in the fundus, as in the fundus a large vessel such as the left coronary artery may be eroded. If the ulcer is not movable it is probably adherent to the pancreas and hæmorrhage is very dangerous as large vessels may be involved. Ulcer penetration into the liver is much less serious.

The usual treatment consists in placing the organs at rest—rest in bed, narcotics, and no food. To increase the coagulation of the blood, gelatine, calcium salts, coagulants, and intravenous injections of concentrated salt solutions are given. All these remedies, however, are very slow and transitory in their effects and will not stop a severe hæmorrhage from a large vessel. Without surgical intervention we are therefore almost powerless and must depend on nature to stop the hæmorrhage by lowering the blood pressure and increasing the rapidity of coagulation.

Regarding the quantity of blood flowing into the stomach and intestine we are in entire ignorance; hæmorrhage may be fatal without causing hæmatemesis or the appearance of blood in the stool. The loss of one-third of the total quantity of blood is tolerated fairly well but the loss of one-half is fatal.

In cases of repeated hæmorrhages, renewed syncope, weakness of the pulse, and a hæmoglobin content between 30 and 40 per cent, more active treatment is necessary. In such cases the author forces the abdominal walls against the spine so that the lower end of the duodenum is compressed. By this procedure the blood is prevented from entering the bowel. The compression is effected by laying a roll of cotton tightly across the umbilical line, fastening it with adhesive, and placing upon it a 10-lb. sand bag. The author left this pad in place in 3 cases for thirty-six hours and in 1 case for forty-eight hours without producing damage to the bowel wall. When the stomach is very low and the ulcer is situated to the right of the midline, the pylorus also is shut off and the tamponade is all the more effective. This method has one danger in that when the ulcer is very easily torn the stomach or intestine, dilated with blood, may be perforated. Therefore the procedure should be reserved for serious cases.

If the bleeding ulcer lies to the left of the median line, compression is not sufficient; the entire stomach fills with blood and when there is dilation the amount of blood lost may be considerable. For such cases the author recommends filling the stomach with air through a small Nélaton catheter introduced through the nose. To the end of the catheter a T-piece is fastened, one arm of which is attached to the pump with which the stomach is filled with air and the other arm brought into a vessel filled with water to a depth of 15 cm. The stomach is filled with air for ten minutes, the arm of the T-piece which extends into the water preventing a greater pressure than 18 cm. of water. This pressure is easily tolerated and will not cause perforation of the stomach. In some cases the pressure may be increased from 3 to 5 cm. of water. This air pressure acts like a tampon. If it does not stop the hæmorrhage surgical interference becomes necessary. Under ordinary conditions resection of the ulcer is indicated. In some cases ligation of the bleeding vessels is sufficient, but if this is impossible, suture of a portion of the omentum over the bleeding area may be done. Only then is gastro-enterostomy indicated.

In extreme and sudden cases the fastening of a towel firmly around the stomach, the filling of the colon with air, and the application of a sand bag to the abdomen may aid in effecting hæmostasis. By these methods the stomach is compressed. The body should be in a horizontal position with the legs raised so that the abdominal organs fall toward the chest and in this way increase the pressure upon the stomach. GANGL (Z).

Eggleston, E. L.: A Critical Review of 500 Cases of Gastric and Duodenal Ulcer. *J. Am. M. Ass.*, 1920, lxxv, 1542.

In this article Eggleston reviews 500 carefully selected cases of gastric and duodenal ulcer. Only those are considered in which the diagnosis was certain and a careful study was made in collaboration with a roentgenologist. In every case more than one year has elapsed since treatment was discontinued.

The author summarizes his paper as follows:

1. The diagnosis of peptic ulcer is not as easy as it is believed to be by a great many medical men. There are a number of abdominal disturbances which disturb the function of the stomach and its chemistry reflexly and cause symptoms closely simulating those of duodenal ulcer.

2. Gastric ulcer is not as common as duodenal ulcer. In the series of cases reviewed 415 of the ulcers were duodenal and 85 gastric in origin. Other statistics differ to some extent, but all show that duodenal ulcer is more frequent than gastric ulcer.

3. More than 10 per cent of these ulcers were designated as "penetrating ulcers." In reality these are ulcers which have burrowed through the posterior wall of the stomach into the neighboring tissue, but have been well walled off so that the escape of gastric and duodenal contents into the abdominal cavity has been prevented. The penetrating ulcer is distinguished clinically by the greater severity of pain, greater local tenderness, and the absence of relief after the ingestion of food or alkalies. Whenever the patient complained of a persistent boring and piercing pain a penetrating ulcer was reported by the roentgenologist and corroborated by the surgeon.

4. A history of hæmorrhage was obtained in 19 per cent of the total number of cases. This does not include cases showing only a slight trace of blood in the stool or vomitus as a small amount of blood in the fæces may be due to a lesion of the lower colon, and a small amount in the vomitus, to the trauma of vomiting or lavage. Hæmorrhage is the complication which is most alarming to the patient and annoying to the physician, but is rarely fatal. In the cases reviewed and all suggestive cases reported during a period of twenty years there has been only 1 case of death from this cause. The severe effects of hæmorrhage are readily relieved by transfusion. In cases of repeated hæmorrhage a gastro-enterostomy should be performed and the ulcer excised or cauterized and infolded.

5. After a definite diagnosis as to the type of ulcer, the chronicity of the condition, etc., there is no organic trouble which responds so readily to organic treatment as peptic ulcer. Seventy-five per cent of the patients treated medically have had no relapse of symptoms in three years. Eighty of these patients were well adapted for medical treatment in that they were well nourished and had no pyloric stenosis or symptoms of threatened perforation. A lapse of months or a year will prove only that the ulcer is healed, for in many cases the condition recurs after the symptoms have been absent for six months.

6. Medical treatment, especially in cases of gastric ulcer, consists of rest in bed, small and frequent feedings, and the administration of moderate amounts of a mixture of sodium bicarbonate, bismuth subcarbonate, and magnesium oxide. An alkaline lavage just before the patient retires will give relief. An important cause of failure in medical treatment is carelessness with regard to the diet. Einhorn's method of tube feeding has proved very satisfactory. Often in cases of multiple ulcer a tube is introduced into the proximal loop of the jejunum and the patient is fed by this route for several months.

7. Forty-seven of the patients included in the group reviewed were subjected to surgery and 21 have never had any digestive symptoms since, while 17 experienced recurrence of symptoms. Three died and the remainder cannot be traced. In all cases of duodenal ulcer in which there is marked pyloric stenosis which fails to yield promptly to medical treatment and those in which there have been repeated hæmorrhages or penetrating ulcers surgical interference is indicated but the patient should be made to understand that an absolute cure cannot be guaranteed.

8. Hyperchlorhydria was found in 72 per cent of the cases and hypochlorhydria in 11 per cent. Fourteen per cent were normal and 2 per cent showed an achylia. The analysis of the stomach contents is of value in determining the treatment and therefore is always justifiable.

9. In all cases the mortality was only 2.2 per cent, a rather significant finding which should lead us to conclude that the prognosis of peptic ulcer is good. Less than 2 per cent of the gastric ulcers developed malignancy; hence there is little danger of carcinoma. Hæmorrhage has little or no danger under the present methods of treatment.

H. K. Begg.

Ivy, A. C.: Studies on Gastric and Duodenal Ulcer. *J. Am. M. Ass.*, 1920, lxxv, 1540.

The author in this article reports upon:

1. The effect of prolonged exposure of the entire mucous membrane of the pyloric antrum to the exterior.

2. The effect of manipulation and infection of an acute ulcer on its healing time.

3. The occurrence of duodenal ulcer following gastroduodenostomy on the dog.

The results of these observations may be summarized as follows:

1. The gross appearance of the mucous membrane after it has been exposed from six to ten months is normal in every respect. Microscopic examination of four pouches which had been made for from six to ten months disclosed no changes. These findings indicate that an altered anatomical and physiological position of the stomach is not the cause of pathologic disturbance.

2. Normally the healing time of an acute ulcer from 1 to 1½ in. in diameter in the mucosa of the pyloric antrum of an intact stomach varies from twelve to eighteen days. The healing time of a similar ulcer in the exposed mucosa of the pyloric pouch varies from fifteen to twenty days. When these ulcers are manipulated twice daily by rubbing the edges with cotton or bread crumbs until con-

gestion and bleeding occur the healing time varies from thirty to fifty days and scar formation is very marked. The delay is similar to that caused in partial pyloric stenosis with acute experimental ulcer. The manipulation delays the proliferation of the mucosal cells at the edge of the ulcer and prevents them from getting a foothold on the base. In other experiments, injections of pus and bacteria were given into the ulcer area in addition to the manipulation. The healing time varied from thirty-three to forty-seven days, a fact which showed that healing was not delayed or influenced by exposure to infection.

3. When gastroduodenostomy was done upon 40 dogs, 5 duodenal ulcers occurred, 3 of the acute perforating type and 2 of the chronic type. These ulcers developed along the line of the clamps and not at the suture line, a fact which suggests that the use of gastro-enterostomy clamps may be injudicious

H. K. Begg.

Lecène, P.: End-Results of Operations for Mesogastric Ulcers (Quelques résultats éloignés d'interventions pour ulcères méso-gastriques). *J. de chir.*, 1920, xvii, 2.

Lecène gives the clinical histories of 5 cases operated upon for mesogastric ulcer with more or less marked stenosis. In 3 of these cases mesogastric resection was done, and in 2, a gastrogastrostomy. The time since the operation varies from six to ten years.

The 5 cases show that the results of operation for mesogastric ulcers are very good. Segmental resection of the portion of the stomach showing an ulcer which causes biloculation is evidently the operation of choice as it makes possible the removal of the ulcer and the re-establishment of the stomach in almost its normal form. This type of operation, however, is not always practicable; it is dangerous, for example, when a cicatricial ulcer is intimately fixed to the pancreas and the patient is very anæmic. For such difficult cases, therefore, Lecène prefers gastrogastrostomy done according to Finney's technique. This procedure leaves the cicatricial ulcer *in situ*, but makes possible the formation of a large anastomotic opening and extensive reunion of the two gastric pockets.

The end-results of gastrogastrostomy, however, are not as good as those of segmental resection; the ulcer persists, and although healed, it is still a source of trouble.

Gastro-enterostomy has been proved an excellent operation in cases of fibrous stenosis of the pylorus or juxta-pyloric ulcers with stenosis, but is very mediocre when an ulcer is situated in the body of the stomach. In cases of close fibrous mesogastric stenosis a gastro-enterostomy done on the cardiac pocket (or even on both pockets) is much less physiological than a gastrogastrostomy and the results are poor. Therefore, since 1910 Lecène has done only resections or gastrogastrostomies in cases of mesogastric ulcers.

W. A. Brennan.

Duggan, N.: Volvulus of the Small Intestine Following Ileocolostomy. *Brit. M. J.*, 1920, ii, 889.

The patient, a woman 62 years of age, had suffered for three years from progressive loss of weight, increasing constipation, frequent attacks of severe indigestion, and abdominal pain. She was leading a semi-invalid life and appeared thin and ill. Laparotomy revealed visceroptosis and a thin and atrophic colon. Ileocolostomy was performed by lateral anastomosis of the closed and divided lower end of the ileum to the pelvic colon. The patient made a good recovery; the bowels acted freely and pain and indigestion were relieved. She remained in improved health for about six and one-half months but was then seized with a sudden acute abdominal pain which gradually became worse. The next day the abdomen was slightly distended and tender, but not rigid, the tongue dry and furred, and the pulse feeble and irregular. Flatus was passed but no fæces. The condition was evidently obstruction, but because of the patient's poor general condition palliative measures were tried first. No results followed a large turpentine enema, and on the third day from the onset vomiting set in.

Operation was then performed under ether preceded by the administration of morphine and atrophine. Two pints of saline were given intravenously and the abdomen was opened by a low median incision. A twisted mass of black and gangrenous intestine, the size of a fœtal head, was found in the pelvis. This proved to be a volvulus of the lower end of the ileum caused by a short, cord-like adhesion between the fold of mesentery. The peritoneal cavity contained a quantity of turbid fluid with a strong fæcal odor. As the intestine involved was already gangrenous, the portion above and below was divided between clamps and a wedge of mesentery was resected. The gangrenous portion broke and distributed its contents in the wound. The cut ends of the intestine were united by end-to-end anastomosis with two layers of catgut sutures and the wound was closed with through-and-through silkworm sutures. The patient made an uneventful recovery.

The second week following operation a troublesome diarrhœa was arrested by the administration of a mixture of hydrochloric acid and malt extract. The wound suppurated only slightly and the patient was able to be about in one month. As the gap between the mesentery of the ileum and pelvic colon had been closed at the first operation and had remained closed, there was no strangulation due to the intestine's slipping through. The adhesions giving rise to the volvulus were no doubt a sequel of the first operation.

K. M. Koons.

Basile, G.: Simple Ulcer of the Intestine (L'ulcus simplex dell' intestine). *Policlin.*, Roma, 1920, xxvii, sez. prat., 1410.

Simple ulcer of the intestinal tract is rarely mentioned in text-books. In 1919 Leotta was able to collect only 22 cases from the literature. As a

rule the lesion is discovered at autopsy or during a surgical operation.

A case observed by the author in 1906 was that of a man 45 years of age who came to the hospital showing the syndrome of diffuse peritonitis which was believed to have had its origin in the appendix. A laparotomy was done but the operation could not be completed because of the patient's condition. Death occurred a few hours later. Autopsy showed the appendix to be normal and very small. On the ileum, about 20 cm. from the ileocæcal valve, were two perforated ulcers the size of a cent.

There was no evidence to show that the ulcers were of tubercular origin or due to trauma or disturbance of the circulation, or any infective or toxic process. Macroscopically they were found to be round and raised and the surrounding wall was intact. Phlogosis and vascular alterations at the margins of the ulcerations were absent. Basile therefore concluded that this was a case of true simple ulcer of the small intestine. In its macroscopic characteristics it resembled the round gastric ulcer and ulcer of the duodenum. W. A. BRENNAN.

Bancroft, F. W.: Acute Appendicitis: A Review of 584 Consecutive Cases. *J. Am. M. Ass.*, 1920, lxxv, 1635.

This is an analytical study of the mortality and complications of 584 consecutive cases of acute appendicitis with special reference to the late results in the cases of 500 patients who were followed for from three months to four years after they left the hospital. The author's chief purpose is to emphasize the importance of early operation and to show the fallacy of the old precept that if operation is not performed at the onset of the attack it is wise to wait until the formation of an abscess. Thirty-five per cent of the series of cases reviewed were late cases in which either a localized abscess or diffuse spreading peritonitis had developed before the patient's admission to the hospital.

The mortality was no lower in the abscess cases than in those of appendicitis with free fluid, and in the former the secondary complications and late sequelæ were greatly increased. The outlook is therefore more favorable in early cases in which closure without drainage is possible. This is evidenced by the fact that in cases without drainage the mortality was 0.83 per cent and in drained cases, 6.8 per cent.

Secondary abscess developed in 6.7 per cent of the abscess cases and 7.8 per cent of the cases with fluid, but one-half of the latter were not drained. This fact and the fact that 2 deaths (8 per cent of the total mortality) might have been prevented by drainage emphasizes the old dictum "When in doubt, drain." Hernia occurred in 18.7 per cent of the abscess cases and 5.5 per cent of the cases with fluid. In addition, fæcal fistula developed in 11.2 per cent and ileus developed in 1.5 per cent of the cases of abscess while none of the cases with fluid showed these complications.

Of the undrained cases, 1.9 per cent, and of the drained cases, 15 per cent developed postoperative hernia. Prolonged drainage seemed to be the most important factor favoring this sequela. Poor musculature and low resistance appeared to be of importance also as the condition was more frequent in infants and after the fortieth year of age.

Of the 584 patients with acute appendicitis, 63.7 per cent were males, while of 446 patients with chronic appendicitis 61.9 per cent were females. Therefore, it appears either that chronic appendicitis does not become acute in women or that the diagnosis of right lower quadrant pain in women is frequently incorrect.

In the cases operated upon early the period of disability was much shorter. Therefore, in view of the fact that delay increases the mortality, the postoperative complications, and the period of disability, the author concludes that operation should be performed as soon as the diagnosis is made.

H. J. VANDEN BERG.

Marulanda, A. E.: Trichocephalus as a Cause of Frequent Chronic Appendicitis in Warm Countries (Los tricocefalos como causa de la frecuencia de la apendicitis cronica en las tierras calientes). *Repert. de med. y cirug.*, 1920, xii, 82.

The trichocephali are thought to be responsible for the greater frequency of chronic appendicitis in tropical countries than in colder climates. Of 20 cases of appendectomy for chronic appendicitis (in 14 of which the operation was performed only for the appendiceal condition and in 6 of which it was done in the course of some other pelvic operation) trichocephali were found in 16. The number in any one case varied greatly, but in 3 cases there were 6, 8 and 10 parasites respectively. The living parasites are anchored deeply in the mucous folds of the appendix by the sharp-pointed extremity while the large clubbed end lies free within the lumen of the appendix.

It is more probable that the trichocephalus is the provocative cause of the appendiceal colic than that the inflammation precedes and facilitates the entrance of the parasite. The anchoring extremity of the trichocephalus acts as a mechanical irritant producing many abrasions of the mucosa which may result in infection. The free clubbed extremity may also obstruct the lumen, thus causing stagnation quite similar to that due to a fæcal concretion. It is also very probable that the movement of the free extremities in an appendix chronically inflamed is responsible for the pain. W. R. MEEKER.

Henes, E., Jr.: The Surgical Treatment of Typhoid Carriers. *J. Am. M. Ass.*, 1920, lxxv, 1771.

Henes is of the opinion that recent work on the detection of chronic carriers of bacillus typhosus has eliminated all of the carriers except those harboring the infection in the gall-bladder and cystic duct. "Kidney carriers" he believes are exceedingly rare, the condition developing only when the kidney

has been previously involved in some other pathologic process. Apparently, however, this is not true as regards "gall-bladder carriers."

In the summer of 1918 the author was able to study typhoid fever particularly with respect to complicating cholecystitis and continued infectiousness in 183 patients who had contracted the condition at the detention camp for interned alien enemy Germans at Hot Springs, N. C., and were sent to U. S. Army General Hospital No. 12 at Biltmore, N. C. His careful and detailed studies seemed to justify the following conclusions:

1. So-called "urinary carriers" are exceedingly rare, and when the condition does occur, pre-existing pathologic lesions of one or both kidneys are responsible for the continued infectiousness of the urine.

2. So-called "intestinal carriers," that is, those in whom cultures from the fæces are persistently positive and repeated cultures from the duodenal contents are persistently negative probably do not exist.

3. Persistent infectiousness from the bowel is directly attributable to an infected gall-bladder.

4. All patients who have suffered from a complicating cholecystitis in the course of typhoid fever should be carefully and repeatedly examined in order that continued infectiousness of gall-bladder origin may be determined.

5. Nearly all patients with complicating cholecystitis will develop cholelithiasis unless operated upon early.

6. Persons who continue to give positive duodenal or fæcal cultures six months after the onset of the disease should be considered persistent carriers.

7. A positive duodenal culture of bacillus typhosus indicates infection from the fæces, and the bacilli will invariably be found in the stool if the proper bacteriological technique is employed.

8. Postoperative cultures from the gall-bladder in the cases of patients who previously showed a positive duodenal culture will usually be positive for typhoid bacilli.

9. Cultures from recently formed stones (crushed) found in a gall-bladder obtained from a case in which a positive duodenal culture was obtained previously will usually be positive for typhoid bacilli.

10. Biliary calculi usually form quickly (three months) after a complicating or post-typhoid cholecystitis.

The author presents seven cases to show the efficacy of the surgical treatment of typhoid carriers and to confirm the observations of Nichols, Simmons and Stimmel. His conclusions are given briefly as follows:

1. Cultural examinations of the duodenal contents are indicated in all cases during convalescence from typhoid fever.

2. Cholecystitis is a frequent complication of typhoid fever.

3. Persistent infectiousness following typhoid fever is usually the result of cholecystitis.

4. A gall-bladder may continue to be infectious without the usual manifestations of a cholecystitis.

5. Cholecystectomy with complete excision of the cystic duct will cure the great majority of typhoid carriers.

6. Radical (surgical) treatment of complicating cholecystitis is to be considered. The likelihood of a carrier state is thereby greatly diminished and the probability of future gall-bladder trouble is obviated.

7. Examination of the duodenal contents should imply an examination of the contents periodically aspirated and cultivated during the course of twelve or twenty-four hours. Three consecutive negative examinations made at weekly intervals indicate cure of persistent infectiousness.

8. Typhoid fever is a preventable disease. The incidence of the infection has been astoundingly decreased by the use of prophylactic inoculation, and more can be accomplished along these lines. Endemic typhoid, however, will continue to exist just as long as we fail to detect persistent infectiousness. The research at Biltmore showed conclusively that the gall-bladder is the seat of continued infectiousness, and this infectiousness can be detected definitely by an intelligent cultural examination of the duodenal contents. No case of typhoid fever is to be judged free from infectiousness until it can be conclusively shown that the gall-bladder and its contents are free from typhoid bacilli. In the event of persistent infectiousness, the indication is definite and absolute for cholecystectomy.

E. C. ROBITSHEK.

Struthers, J. E.: Multiple Polyposis of the Intestinal Tract. *Ann. Surg.*, 1920, lxxii, 649.

A careful review of the literature on intestinal polyposis is presented and 39 cases of this disease observed in the Mayo Clinic from January, 1911, to February, 1920, are studied with regard to the etiology, pathology, symptoms, and other important data.

Multiple polyposis of the intestinal tract is a serious disease of obscure origin. Although persons of any age from adolescence to physiological decline are affected, 37.5 per cent of the cases are those of persons between 19 and 30 years of age. The number of cases decreases progressively with the advance of years. The disease occurs more frequently in males than in females, the sex ratio being 2.9 to 1.0. In the cases reviewed the duration of symptoms ranged from three weeks to thirty-four years; 66 per cent of the patients had had symptoms for three years or more, while 54 per cent had had symptoms for five years or more.

The principal symptoms are a sense of weight in the rectum, tenesmus, bleeding, diarrhœa, vague abdominal pain, colics of obscure origin, partial obstruction, and essential hæmorrhage. Essential hæmorrhage is a nearly pathognomonic sign of this

lesion. The rectum, the sigmoid, and the splenic and hepatic flexures are most frequently involved. Thirty-four of the 39 patients had periods of diarrhœa and 31 had abdominal pain at some time during the course of the disease. Rectal pain, bleeding, loss of weight, etc. were variable and at times due in part to coincident lesions such as gastric ulcer, duodenal ulcer, and hæmorrhoids. All except 2 patients had a loss of weight ranging from 10 to 60 lb. A study of the blood in 29 cases showed a hæmoglobin content below 50 per cent in only one-fourth of the cases. Examination of the stools also contributed very little to the study. The value of proctoscopic examination is evidenced by the positive findings in 28 cases.

Twenty-two patients were treated surgically by various types of operation, including the Brown operation, ileocolostomy, colectomy, ileosigmoidostomy, the Mikulicz operation, the two-stage Kraske operation, appendicostomy, and the Desquin-Mixter operation. Nineteen of the patients treated surgically have been accounted for; the mortality among these was 47.34 per cent. Twelve of 14 patients treated medically were heard from; the mortality was 25 per cent. In comparing these two groups of statistics it should be remembered that medical treatment afforded no possible hope for recovery in the cases of patients who came to operation and that surgery gave them the only chance for life.

The findings at operation and necropsy indicate that multiple polyposis is a diffuse condition of the colon. The findings of Hewitt and Howard, that in the rectum polypi are situated along the side of the intestinal wall while higher up in the colon they are situated along the line of mesenteric attachment, have not been confirmed in the Mayo Clinic.

Schwab's theory of chronic constipation in the etiology of the lesion is hardly tenable in view of the prevalence of polyposis in males and the high incidence of chronic constipation in females. Proctoscopic examination of patients and microscopic examination of specimens removed at operation frequently show ulceration associated with polyposis and tend to confirm Rokitansky's theory that intestinal polypi arise from the margins of dysenteric ulcers.

According to the pathology, intestinal neoplasms are classified as papillomata, polypi, and adenomata, the latter predominating (40 per cent). In a large percentage of cases there is a progressive general colitis which forms a number of undermining coalescing ulcers so that large areas become involved. Portions of the mucosa and submucosa supplied by primary arterial branches are preserved, and as healing takes place the irregular margins of those elevations are smoothed off and remain as polypoid projections. Subsequent cicatrization may occlude the tubules while continued functioning of the secreting cells results in small retention cysts. Friction and traction on these elevated areas cause the formation of pedicles. Further inflammatory or degenerative changes may occur. Adenomata do not become malignant more frequently than polypi or papillomata. The most marked involvement is found in the chronic cases and, conversely, the area involved is most localized in the acute cases.

J. W. PANGBURN.

McKay, H. S.: Vesico-Intestinal Fistulæ. *J. Missouri M. Ass.*, 1920, xvii, 489.

Vesico-intestinal fistula is an uncommon condition, only 342 cases having been reported in the literature. The causes giving rise to such fistulæ most commonly occur in the intestinal tract. The chief etiological factors are malignant growths and tuberculosis. In rare cases rectal abscess, rectal ulceration, disease of the appendix, syphilis, or actinomycosis is responsible. Less often the causative lesions are found in the bladder. An indirect factor may be abscess of the pelvis or trauma.

In the collected cases the opening in the intestinal canal was found most frequently in the rectum, and next most frequently, in the sigmoid. In the remaining cases it was discovered in the small intestine and cæcum. The fistulous tract may be direct or extend through a sinus.

As a rule the diagnosis may be made easily by means of the cystoscope, sigmoidoscope, and roentgen ray.

The cardinal symptoms are the passage of gas and fæces through the urethra and the passage of urine through the rectum. After perforation has occurred the symptoms are usually aggravated; urination then becomes painful and eventually the kidneys are infected. The most annoying single symptom is pneumaturia.

The prognosis depends largely on the nature of the primary lesion and is most unfavorable when carcinoma or tuberculosis is the cause. When trauma or inflammatory disease is the etiological factor the prospect of cure is more favorable as these cases may be subjected to operative treatment.

The form of treatment also depends on the cause. In cases of fistula due to trauma, abscess, or disease of the appendix, operation is especially satisfactory. In some instances in which the condition is due to tuberculosis or syphilis spontaneous healing has occurred under treatment. R. R. MUSTELL.

Lane, W. A.: Cancer of the Colon: Its Causation and Treatment. *Lancet*, 1920, cxcix, 1184.

Before considering the operative treatment of cancer of the colon Lane puts forward his views with regard to the conditions which antedate and produce cancer of the large bowel. An understanding of these factors may lead to the control or prevention of the development of cancer.

The causal factor of cancer in any part of the body is traumatism in the widest sense of the word. A second factor is degenerative change in the body tissues, the result of the products of intestinal autointoxication or syphilis or both. The third, or unknown factor, is designated ' X" and does not act

except in the presence of the results of traumatism and degenerative factors. It is distinctly probable that the factor X may be overcome by removing the traumatic and toxic factors on which it depends. Thus, by proper legislation, the incidence of syphilis could be reduced greatly and its effects could be diminished by early and efficient treatment.

The gastro-intestinal tract affords an excellent illustration of the manner in which traumatism produces ulceration and cancer as the tongue, the pharynx, the œsophagus, the lesser curvature of the stomach, and the immediate vicinity of the pylorus are exposed to constant injury either in the form of impact or strain; the same principle applies to the incidence of cancer of the colon.

The mechanical factor is intimately bound up with the toxic factor in the condition of chronic intestinal stasis. Lane raises the question as to whether anything can be learned from the immunity of the duodenum and small intestine to cancer. In the duodenum especially the several factors that produce cancer elsewhere in the intestinal tract are present; namely, the mechanical, the toxic, and presumably the factor X. That X is unable to influence an ulcer of the duodenum cannot be due to the presence of bile or pancreatic juice since cancer develops in the ducts of the organs secreting these juices. Mutch observes that the area of freedom from the effects of the factor X corresponds to the distribution of enterokinase, the ferment of ferments which activates the precursor of trypsin.

In chronic intestinal stasis there are two distinct factors: the primary, which is solely mechanical, and the secondary, which is essentially toxic and results from the action of the mechanical or traumatic factor. The author illustrates the variation in the behavior of the individual to stasis by describing this condition in a patient with little vitality and in one with great vitality. In persons with little vitality there is no attempt to form resistant or retaining membranes; the pelvic colon is elongated, the iliac, descending, and transverse segments become elongated, tortuous, and prolapsed, and the cæcum and ascending colon dilate and prolapse. The marked feature is the absence of any acquired membrane or crystallization of a line of force tending to obviate or control the prolapse. The intestines are dilated and their walls are thin and flaccid. The pylorus is but moderately spastic and the stomach is dilated, with little or no hypertrophy of its walls; hence the failure of gastro-enterostomy to relieve this condition. In this type auto-intoxication is the marked feature, and abdominal symptoms, except for constipation and flatulence, are absent or of minor importance unless there is inflammation of the mucous membrane of the cæcum, ascending colon, and part of the transverse colon. In this event there may be associated spasm of the muscular wall which reduces the lumen and limits the passage of the contents. The treatment of choice for this condition is colectomy. Hemi-colectomy or suspension does not correct the cause of the disease. Lane removes the large bowel to the level of the pelvic colon and inserts the extremity of the ileum directly into the lower limit of the pelvic colon.

Stasis in persons with great vitality presents symptoms which are chiefly mechanical. The delay in the passage of the colonic contents is met by the formation of bands and membranes in certain definitely localized situations. The first kink to appear is at the juncture of the iliac and pelvic segments. Secondary to the obstruction exerted by this kink is the development of bands in the peritoneum on the outer aspect of the descending colon followed by the formation of bands at the splenic flexure. Bands from the gall-bladder, liver, pylorus, and duodenum attach to the hepatic flexure; similar bands develop from the peritoneal reflection from the cæcum at the level of the iliac crest; and a controlling appendix or ileal kink is frequently present. The pylorus is hard and contracted, while the stomach is usually somewhat dilated and its musculature is hypertrophied. An ulcer may be present at the pylorus or on the lesser curvature. As there is no ulceration of the mucous membrane of the colon, the contents accumulate behind the several acquired points of obstruction.

Diverticula, consisting of hernial protrusions of mucous membrane through the muscle coat, may occur in the colon proximal to the obstruction. Fæcal concretions may form, infection develop, and subsequently cancerous foci may appear in the bowel damaged by traumatism.

Of great importance is the fact that patients with little vitality do not acquire cancer of the colon any more than cancer of the stomach or œsophagus, while those with high vitality are very liable to the formation of cancer at any of the points of obstruction produced by acquired bands, in the situation of the muscle at the juncture of the pelvic colon and rectum to which W. J. Mayo has called attention, and about the sphincter ani.

The explanation of the different frequency of cancer in the two types is obvious. In the first type the elongated bowel with feeble muscles, inflamed mucous membrane, and scanty contents exerts but little effect at the juncture of elongated loops. In the second group the bowel is not elongated, the musculature is hypertrophied, fæces are abundant, and obstruction is acute and well defined. The auto-intoxication in the first type of case causes degenerative changes in the breasts, uterus, ovaries, and other organs, and renders them much more liable to cancer than those of the second group.

Mechanical causal factors determining the development of cancer of the colon are: (1) the constriction of the lumen of the bowel, (2) the thrust of the hypertrophied muscle coat proximal to the obstruction, and (3) increasing desiccation of the fæces.

Stasis can be prevented by proper diet and the use of paraffin oil before meals. Clinically, cancer of the colon is usually not recognized until symptoms of obstruction appear.

The treatment varies with the location and extent of the growth, the condition of the intestines, the patient's vitality, the amount of invasion of adjacent viscera, metastasis, the degree of intra-abdominal tension, the patient's age, and the circumstances under which the operation is performed.

Of great practical interest is the fact that postoperative adhesions are rare in the colon, probably because of hypertrophy of the musculature of the bowel which is then capable of vigorous peristalsis.

Colectomy is the ideal operation for cancer of the colon providing it is possible to secure a sufficient length of pelvic colon into which the end of the ileum can be inserted directly. There are many advantages to colectomy. A perfectly secure junction of the end of the ileum to the pelvic colon can be effected readily; the ileal contents are evacuated at once by means of a large œsophageal tube passed up through the anus for about 6 in. above the junction. This tube is left in for six days. If a large amount of material has collected above the obstruction it is removed in its entirety and the system is freed of its deleterious effects. The abdomen is left flaccid after the operation. There is prompt relief of ileal stasis and its consequences. In cancer in any other situation than about the last kink, resection of the colon removes the risk of a subsequent growth. The operator is enabled to deal effectually with any secondary glandular infection and in a fat patient the risk may be somewhat reduced by dividing the transverse colon to the left of the midline, excising the proximal large bowel, and inserting the end of the ileum directly into the side of the pelvic colon.

In a certain number of cases of acute obstruction, in which the patient's condition does not permit any extensive procedure, a lateral anastomosis between the large bowel proximal to the growth and that distal to it may be effected and colectomy performed later.

When there is a large amount of intra-abdominal tension at the close of the operation it is advisable not to attempt to bring the edges of the muscle wall together, but merely to suture the margin of the skin incision to prevent the escape of intestinal contents.

CLAYTON F. ANDREWS.

Turner, G. G.: The Surgical Treatment of Cancer of the Rectum: Sacro-Abdominal Excision. *Brit. M. J.*, 1920, ii, 734.

The spread of cancer of the rectum has a direct bearing on its surgical treatment. No matter how extensive an operation is performed it may not bring about cure. Pathologic investigation and clinical experience show that: (1) the local spread of cancer by continuity and contiguity is more important than its dissemination by the lymphatics whether through the lymph stream or by permeation; (2) for a comparatively long period the disease is strictly local; (3) malignancy is activated in the young and vice versa; (4) there are notable variations in the type of growth, especially with regard to dissemination.

The author outlines the various types of operation which may be performed. The abdominoperineal operation includes the abdominal removal of the entire pelvic colon with its mesocolon, a strip of peritoneum on either side of it at least 1 in. wide, and the lymph nodes situated over the bifurcation of the left common iliac artery. Perineal removal of the whole rectum and its perirectal tissue is also done. Local resection means the cutting away of a part of the circumference of the bowel bearing a growth. Perineal excision is the removal of the whole lower portion of the rectum, including the sphincter, but no part of the coccyx or sacrum is excised. Sacral excision is the extirpation of the whole of the rectum from below after removal of the coccyx and the last one or two portions of the sacrum. The sacro-abdominal excision is a removal which is begun from below by a thorough separation of the rectum as in sacral incision and is completed by opening the abdomen so that the upper limits of a high-lying growth may be removed completely under the guidance of the eye. In abdominal removal the highest part of the rectum is excised entirely from above. In most of the operations described restoration of the continuity of the bowel is impracticable and the combined operations necessitate the formation of a permanent inguinal anus.

K. M. KOONS.

Miles, W. E.: The Surgical Treatment of Cancer of the Rectum: Operative Methods Compared. *Brit. M. J.*, 1920, ii, 730.

An operation undertaken for the cure of cancer must be based on the pathologic findings and the field of operation must embrace all tissues apt to become invaded. The question of operative treatment, therefore, necessitates a knowledge of the manner in which cancer of the rectum spreads and the paths it takes.

In the early stage an adenocarcinomatous tumor of the rectum is confined to the mucous membrane and submucous tissue. It is sessile and readily movable upon the subjacent muscular coat, gradually increases in size, and spreads in three distinct ways: (1) by direct extension through continuity of tissue, (2) through the venous system, and (3) by means of the lymphatic system.

Spread of growth by direct extension through continuity of tissue.—Although the tumor is freely movable at first, it soon becomes adherent. Extension takes place in all directions, but more in the transverse than in the longitudinal axis of the bowel. Adherence begins at the center or the oldest part of the tumor, but surface extension may progress more rapidly in one direction than another, thus fixing the indurated portion nearer one lateral margin than the other.

It is difficult to determine how long a growth has been present. From observations of tumors in the ampulla of the rectum, however, it

may be inferred that by the time three-quarters of the circumference of the bowel is involved the growth is more than one year old.

While the growth is extending around the circumference of the bowel, infiltration of the muscular coat is taking place. This penetration continues until it is arrested for a time by the lymph sinus between the outer surface of the bowel and the surrounding fatty tissue. The growth finally extends across this space and involves the perirectal fatty tissue and the fascia propria of the rectum. Penetrated fixation to the sacrum, prostate, bladder, uterus, or vagina is impossible until the fascia propria has been involved. This would not occur, therefore, until a year after the earliest symptoms indicating the presence of the growth.

Direct extension of carcinoma of the rectum is comparatively slow, and invasion of the surrounding tissues does not take place until the greater part of the circumference of the bowel has become involved.

Spread of growth by the venous system.—Microscopic specimens afford evidence of direct invasion of venous radicals. It is therefore easy to understand how even in an early stage cancer cells may be detached and carried to a great distance from the primary growth, especially to the liver. Fortunately, this mode of spread is rare, and definite liver metastases are generally a late manifestation.

Spread of growth by the lymphatic system.—The most important route by which cancer cells are disseminated is through the lymphatic channels. In the rectum there are two distinct sets of lymphatic channels by means of which such spread takes place; i. e., the intramural and the extramural lymphatic systems. Dissemination in the intramural system is of very limited extent. The general scheme of the extramural lymphatic channels is represented in Fig. 1. The various tissues traversed by these vessels are vulnerable to metastatic deposits. Corresponding to the three lymphatic areas there are three zones of spread: (1) the zone of downward spread, which includes the peri-anal skin, the ischiorectal fat, and the external sphincter muscle, (2) the zone of lateral spread, which embraces the levatores ani muscles, the retrorectal lymph glands, the internal iliac glands, the base of the bladder, and the vesiculæ seminales, and, in the female, the posterior wall of the vagina, the cervix uteri, and the base of the broad ligament with Poirier's gland, (3) the zone of upward spread, which includes the pelvic peritoneum, the pelvic mesocolon in its entirety, the paracolic lymph glands, and the group of lymph glands at the bifurcation of the left common iliac artery. The author concludes that early growth in cancer of the rectum may metastasize widely into these zones and cannot be detected by ordinary rectal examination.

The peritoneum, especially that portion which lies on either side of the parietal attachment of the pelvic mesocolon, is very often the seat of growth.

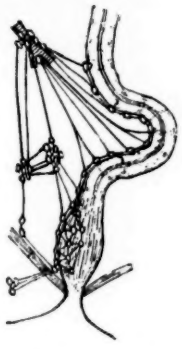

Fig. 1. Schematic representation of the extramural lymphatic system of the rectum and pelvic colon.

Deposits no doubt begin in the subperitoneal lymphatic plexus, and the small intestine, coming into contact with an exposed placque, may become infected and cause widespread dissemination. The pelvic mesocolon is also very frequently the seat of metastatic deposits even in early cases. Lastly, the paracolic glands may become the seat of metastasis. Cancer cells do not spread according to the anatomical lymphatic distribution but according to laws of their own. Thus metastasis may occur in any or all of these zones irrespective of the position of the primary growth.

Cancer of the rectum, regardless of its position, is apt to spread to the tissues of the three zones described. The most vulnerable of these are the ischiorectal fat, the levatores ani muscles, the retrorectal glands, and the pelvic mesocolon. Therefore these tissues must be freely removed in an operation for cancer of the rectum.

Pathology ordains that all tissues involved must be removed. The operations devised to fill these requirements are: (1) perineal excision, (2) perineal resection, (3) vaginal resection, (4) the abdominoanal operation, and (5) the radical abdominoperineal operation.

The first four of the operations listed fail because they do not include all points of metastatic involvement. Figs. 2 to 7 illustrate the various operations and the evolution that has taken place.

The radical abdominoperineal operation (Fig. 7) was planned to include the tissues forming the zone of upward as well as of lateral and downward spread. The author performs a preliminary colostomy and later removes the whole of the pelvic colon, except the part utilized for forming the colostomy, together with the whole of the rectum encased in its sheath of fascia propria; the whole of the pelvic mesocolon; the peritoneum lining the floor of the pelvis, together with a strip on either side of the parietal attachment of the pelvic mesocolon; the whole of the levatores ani muscles; the external sphincter muscle; as much as possible of the ischiorectal fat; and a

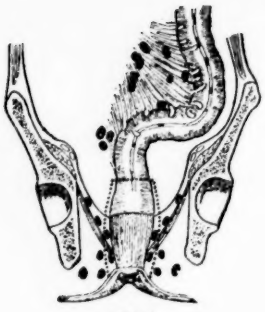

FIG. 2

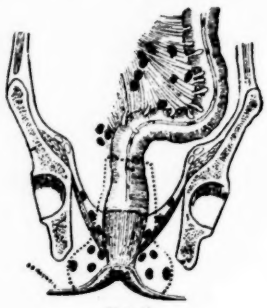

FIG 3

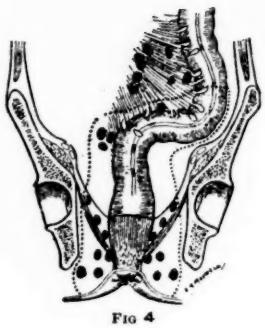

FIG 4

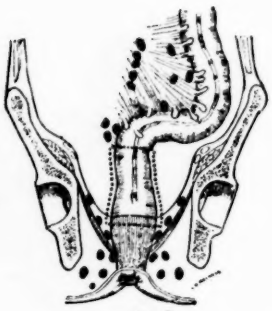

FIG 5

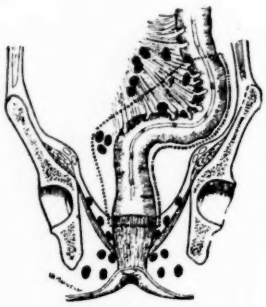

FIG. 6

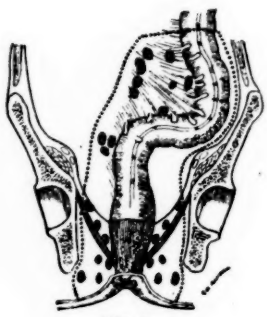

FIG. 7

Fig. 2. Diagram showing the restricted nature of Kraske's operation. The rectum is merely dissected out as a tube containing a cancer, and the vulnerable tissues of the upward, lateral, and downward zones of spread are left.

Fig. 3. Diagram showing the first step in the evolution of the radical operation. The peri-anal skin and the ischiorectal fat were widely removed as these tissues have been found vulnerable to recurrence.

Fig. 4. Diagram showing the extension of the operative field as a further step in the evolution of the radical operation. In addition to the peri-anal skin and the ischiorectal fat, all of the levatores ani muscles and the lower part of the pelvic mesocolon were included as these tissues were found to be highly vulnerable.

Fig. 5. Diagram showing the limited character of the removal in perineal resection and vaginal resection.

Fig. 6. Diagram showing how much of the vulnerable tissues of the three zones of spread is left behind by the abdomino-anal operation. Even when the proximal end of the colon is brought down to the anus, the vulnerable tissues of the lower zone are left.

Fig. 7. Diagram showing the final stage in the evolution of the radical operation. Whereas the vulnerable tissues in the lateral and downward zones of spread may be removed completely by an operation carried out from the perineum alone, the greater part of these contained in the upper zone remain out of reach. These tissues, which correspond to the axilla in the breast operation, can be removed only by the radical abdominoperineal method.

(The Surgical Treatment of Cancer of the Rectum — W. E. Miles.)

wide area of peri-anal skin. The operation should be done on cases of early cancer.

In the author's last series of 11 cases the operative mortality was 18.1 per cent. K. M. KOONS.

Lockhart-Mummery, J. P.: Recent Advances in the Surgical Treatment of Cancer of the Rectum. *Brit. M. J.*, 1920, ii, 737.

The most noticeable improvement in operations for cancer of the rectum is the much more extensive resection now performed. Local excision of the growth as done twenty years ago is almost never practiced today.

The author was one of the first surgeons in England to perform the abdominoperineal operation, but soon found it objectionable as a routine procedure, chiefly because of its high mortality. Most of the patients are old and unable to undergo so severe an operation; moreover, it is exceedingly difficult and dangerous in the cases of stout patients. The author still uses it, however, when the growth is situated high or extensive removal is indicated.

Lockhart-Mummery has devised a new technique which permits free removal of the growth and brings the mortality within a reasonable limit. In 1918 he performed the operation twenty-four times with no

mortality. The first stage consists of a preliminary colostomy through the left rectus and abdominal exploration. A week later the second operation is done under spinal anæsthesia. The anus is sealed before the operative field is prepared. The rectum is freed in front and from the perineum upward. The peritoneum is opened from the front and divided close to the rectum. The bowel is divided with the cautery between clamps, and the end is invaginated. The wound is closed without drainage.

In 100 cases the results with regard to recurrences have been quite as good as in those treated by abdominoperineal excision. K. M. KOONS.

LIVER, GALL-BLADDER, PANCREAS, AND SPLEEN

Roberts, D.: The Roentgenological Diagnosis of Gall-Bladder Lesions. *J. Am. M. Ass.*, 1920, lxxv, 1534.

In view of the advances which have been made in roentgen technique in the last few years, especially in bringing out soft-part detail, the common belief that only from 10 to 15 per cent of gall-stones can be visualized and that the pathologic gall-bladder is rarely demonstrable by roentgen examination is no longer tenable. Few gall-stones are devoid of a lime-containing layer, and even these few may be shown as they are less dense than the surrounding tissues or the fluid in which they lie and hence will cast negative shadows.

While there are at present insuperable obstacles to the visualization of all gall-stones, the roentgen diagnosis will be put on a thoroughly practical and reliable basis with only a negligible proportion of unavoidable errors as the technique is developed and simplified. The enlarged gall-bladder can easily be visualized, but at present it seems that there is a small number of cases of chronic cholecystitis without stones or dilation which cannot be determined by roentgenography. In view of the large percentage of known stones which have been visualized, the importance of negative findings cannot be lightly dismissed. It is impossible properly to estimate the importance of negative findings on the basis of the percentage of failures in a demonstrated series because the failures occur in the cases of heavy subjects. The importance to be attached to negative findings depends on the character of the roentgenograms. In some cases the results do not warrant a negative opinion; in others, they may be fairly satisfactory and make it improbable that stones are present. The perfectly satisfactory series, however, that is, an adequate number of roentgenograms showing a wealth of detail, may warrant a negative diagnosis of stones or enlarged gall-bladder.

The satisfactory roentgenogram for gall-stone diagnosis should show the liver edge clearly, the entire outline of the kidney, and sharp, clear-cut lines of the hepatic flexure. Absolute immobility during the exposure is essential. To this end, the exposure should not be any longer than is necessary to bring out all possible gradations of density and the penetration of the tube used should be chosen with a similar aim. The use of duplitized films with fast double screens is of great importance in obtaining satisfactory plates. The author's best results were secured with a fine focus gas or hydrogen tube, a plate target distance of from 28 to 30 in., a small diaphragm, and a long cone giving an exposure field of only 5 or 6 in. A parallel spark gap of 2½ to 3½ in. was used regularly, and a milliamperage of from 20 to 30 in the tube. Exposures were made with the patient prone on the cassette during forced, sustained expiration. In an effort to bring out detail the film was slightly underexposed and the development pushed short of causing a fog.

With increasing detail the percentage of stones that are definite at a glance is greatly increased, but the majority of diagnoses of stone are reached safely only by prolonged study and a comparison of different exposures. The reducing camera has come into routine use in the study of all doubtful cases as the results it gives in the concentration of images are extremely valuable. Indirect suggestive evidence of a gall-bladder lesion is frequently obtained from a study of the stomach, duodenum, and hepatic flexure of the colon at different intervals after the ingestion of an opaque meal. Antrum and cap distortion not characteristic of ulcer may be extremely suggestive of gall-bladder adhesions, and the constant concavity on the inner side or above the hepatic flexure may serve to locate a dilated gall-bladder which subsequently may be intensively studied. The greatest care is necessary in drawing conclusions from these apparent distortions. On the whole, reliance must be placed chiefly on direct evidence. The recognition of gall-bladder lesions from the roentgen standpoint depends on either the visualization of the gall-bladder or the demonstration of stones, or both.

From clinical and experimental studies of removed gall-bladders and bags containing various solutions and specimens of bile certain conclusions with an important bearing on the interpretation of gall-bladder roentgenograms have been reached:

1. A bag of fluid in the upper abdomen can be visualized more or less distinctly according to its anteroposterior thickness or mass.

2. The density of the image of such a fluid bag varies imperceptibly with the fluid.

3. Pathologic tissue such as a new growth or a thickened gall-bladder wall may be visualized as is the kidney if its mass is sufficiently great, but only in rare cases is the gall-bladder wall sufficiently thickened by inflammation to give rise to a definitely recognizable image.

4. The visualized gall-bladder is a gall-bladder sufficiently dilated and increased above the normal in its mass to give a definite image.

5. In general, fluid is more dense than gall-stones with a low content of lime salts. Experimentally it was found that stones immersed in

fluid and roentgenographed cast a positive or a negative shadow or no shadow at all according to the density of the stones and the thickness of the layer of fluid.

The gall-bladder when visualized is sharp in its outline and suggests a flaccid bag. Its location, shape, and size are variable. Great care is necessary not to mistake for the gall-bladder other suggestive dense shadows which are cast by other viscera, especially the kidney.

As regards gall-stones and their roentgenographic characteristics, the author states that the radial cholesterin stone is less dense than all the surrounding tissue and can be visualized only as a negative shadow, i.e., a round or oval dark spot. The combination stone has a partial or complete layer of limesalt around it. Cholesterin-bilirubin calcium stones do not show as rings or triangles but as solid spots or elongated finger-like dense areas. Common multiple-faceted stones include nearly half of all stones observed. They present an irregular mosaic picture or spotty appearance. In heavy subjects they frequently cannot be visualized and allowance must always be made for this fact in making negative diagnoses. Pure bilirubin-lime stones are usually very small and therefore their recognition is impossible. The calcium bilirubinate stone throws a solid unmistakable shadow.

Of the cases which formed the basis of the conclusions reached, Series 1 included 18 cases which were definitely known to be cases of stone. In all of these the stones were demonstrated by roentgenographic study, although in some instances several attempts were necessary. Series 2 was made up of 70 cases in which stone was suspected. The roentgen findings were positive in 45 and negative in 25 cases. Thirty of the positive and 19 of the negative cases were explored. Three of the positive diagnoses were incorrect, two mistakes being due to the accidental use of the same defective screen in every one of a short series of exposures, and the third being due to a shadow thrown by calcification of undetermined site outside the gall-bladder. No stones were discovered in any of the negative cases, but in 3, chronic catarrhal cholecystitis without dilation was found on removal of the gall-bladder. No stones could be visualized in 3 cases in which operation had not been performed, but in which it seemed probable that stones were present. The third series comprised the cases of young mothers who were referred for a diagnosis of upper abdominal complaints which seemed very definitely to be due to gall-bladder inflammation without stones. In none of these was the gall-bladder visualized, a fact which convinces the author that the catarrhal unobstructed gall-bladder is not demonstrable and that the gall-bladder of normal size can rarely be demonstrated.

The following conclusions are appended:

1. The roentgenological diagnosis of gall-stones and the dilated gall-bladder is possible at the present time, the percentage of failures being small.

2. Negative diagnosis has a value proportionate to the intensity of detail and the sharpness of the image. It has very little value when the subject is so heavy that satisfactory roentgenograms cannot be made. Subjects of slight or medium body thickness can be roentgenographed with an intensity of detail that justifies an experienced interpreter in a negative diagnosis of stones or dilated gall-bladder.

3. The roentgenological diagnosis of gall-stones necessitates such an expenditure of time and money to obtain satisfactory exposures and such extensive experience in the interpretation of intensely detailed roentgenograms that it is not at present a safe and practical method of diagnosis for general adoption. Ten or fifteen per cent of stones can be plainly visualized even by an extremely poor equipment and technique, but under such conditions the importance to be attached to negative findings is negligible.

4. Gall-bladder roentgenograms with satisfactory detail can be made only with direct rays of low penetrating power and duplitized films with fast screens.

5. An insuperable limitation of roentgenological diagnosis of gall-bladder lesions is the apparent impossibility of securing roentgenographic evidence of chronic cholecystitis without dilation or of new growth of the gall-bladder and biliary ducts.

ADOLPH HARTUNG.

McGuire, E. R.: Two Hundred and Fifty Operations on the Gall-Bladder and Ducts. *Surg., Gynec. & Obst.*, 1920, xxxi, 617.

The author does not believe that a large percentage of the cases of gall-stones are symptomless. In his opinion the "silent common duct" is not silent but merely indistinct.

A carefully taken history is of first importance in the diagnosis. The X-ray is of value chiefly for the negative information it gives. The time is not far off, however, when the X-ray diagnosis will be almost as accurate in cases of gall-stones as it is in cases of renal stones.

The pathology and its bearing on the type of operation chosen is discussed. Cholecystectomy is favored as it gives the highest percentage of cures.

The conclusions drawn are as follows:

1. All gall-stones have their origin in a primary cholecystitis.

2. Typhoid bacilli are present in only from 7 to 10 per cent.

3. The mode of transmission of the primary infection has not been determined positively. It is probable, however, that it is almost always carried by the blood stream, and rarely, if ever, by direct extension. It is doubtless frequently associated with a primary lesion elsewhere in the abdomen.

4. The appendix is very often found to be diseased when stones are discovered in the gall-bladder. Appendix disease is probably the cause of the pri-

mary cholecystitis more frequently than is commonly believed.

5. Gall-stones are rare in young people. Less than 15 per cent of the cases reviewed were those of patients under 30 years of age, while over 60 per cent were those of persons between the ages of 30 and 50 years.

6. Jaundice has received too much emphasis as a diagnostic symptom. Probably when the primary cholecystitis is present, a goodly proportion of the patients have a mild jaundice, but it is slight and usually forgotten. Stones in the gall-bladder or the cystic duct produce jaundice only by exerting pressure on the common duct or by associated cholecystitis.

7. Attacks of pain in the right upper quadrant constitute the most frequent symptom of stones.

8. Cholecystectomy is the operation of choice when there are stones in the gall-bladder or cystic duct. It is probably the operation of choice also when stones are in the common duct, if one is positive all stones have been removed, because stones in the common duct are so often associated with old contracted gall-bladder.

9. The mortality from cholecystectomy is now sufficiently low so that a decision for or against the operation should be based largely on the percentage of ultimate cures.

10. In cancer of the pancreas the mortality is so high that operation is prohibited. If operation is done, an anastomosis between the gall-bladder and stomach is the procedure of choice. K. L. VEHE.

Lorenz, H.: A Further Contribution to Bile-Tract Surgery; Transduodenal Choledochotomy, the Normal Procedure in Common Duct Stone (Ein weiterer Beitrag zur Gallenwegchirurgie. Die Choledochotomia transduodenalis—das Normalverfahren bei Choledochusstein). *Med. Klin.*, 1920, xvi, 669.

The transduodenal choledochotomy, which the author recommends for cases of stone in the common duct in preference to supraduodenal opening of the common duct, is performed as follows:

The duodenum in its descending portion is opened across, and through this opening an exploration is made as far as the papilla, the lowest part of the common duct. If a stone is found in the papilla it is removed, the duct being incised as much as necessary. The mucous membrane of the common duct and the duodenum is then quickly sutured with very fine silk.

By this procedure, especially when the bile tract is opened up sufficiently, an examination of the opening of the pancreatic duct is made possible. Healing occurs more quickly than after other methods as often the operative wound may be closed primarily. The differential diagnosis as regards chronic appendicitis and pyloric ulcer the author deems very difficult. In conclusion he urges that operation be performed earlier than is usually the case. JURACZ (Z).

MISCELLANEOUS

Ullman, A., and Levy, C. S.: Subphrenic Abscess; Report of a Case with Cure. *Surg., Gynec. & Obst.*, 1920, xxxi, 594.

Four intraperitoneal and two extraperitoneal spaces are recognized. The subphrenic space is divided into a right and a left part by the falciform ligament. These parts are in turn divided into a larger anterior and a smaller posterior space by the corresponding lateral ligaments. The right extraperitoneal space lies between the layers of the coronary ligament, and the left extraperitoneal space around the upper end of the left kidney in the perinephritic spaces. Pus may collect in any of these spaces and at times may cause symptoms indicating the space involved, as follows:

1. *Right anterior intraperitoneal space.*—The liver becomes adherent to the diaphragm in front, pus is localized at the upper and posterior parts of the process, and the diaphragm is pushed up, giving signs of right lung compression. This type usually follows appendicitis. Because of adhesions, the liver does not descend; therefore the right hypochondrium and epigastric regions are not tender.

2. *Right posterior intraperitoneal space.*—Swelling is noted in the right hypochondrium, and occasionally also in the right lumbar region. This type is most often associated with other varieties of subphrenic abscess.

3. *Left anterior intraperitoneal space.*—The abscess is usually due to a perforated gastric ulcer. There is swelling in the epigastrium and left hypochondrium with signs of compression of the left lung. This type of abscess contains gas.

4. *Left posterior intraperitoneal space.*—The signs are suggestive of pancreatic cyst. Abscess is rare.

5. *Right extraperitoneal space.*—Infections from the right kidney, the posterior surface of the duodenum, and a retrocæcal appendix may burrow along the space, pushing the peritoneal reflection of the liver further back and the liver lower into the abdomen. The abscess may extend between the layers of the falciform ligament and point in the midline of the epigastrium. This type of abscess may be incised without opening the peritoneal cavity. It must be differentiated from the right anterior intraperitoneal abscess where the liver cannot be pushed down because of adhesions.

6. *Left extraperitoneal space.*—This space is situated in the retrocellular tissues of the left loin. Infection arises from the left kidney, the pancreas, the ascending colon, and the lumbar glands. Abscesses in this space are rare.

As a clinical basis Piquand's classification is satisfactory: (1) anterior inferior abscesses mainly with abdominal signs; (2) superior subphrenic abscesses with thoracic symptoms; and (3) retroperitoneal abscesses with signs of lumbar swelling. Abscesses are more common on the right side than on the left side and the intraperitoneal type is more common than the extraperitoneal type. Bilateral abscesses

are infrequent. After appendicitis the intraperitoneal variety is the more common.

The collection of pus below the diaphragm has been attributed to: (1) the suction action of the thorax during respiration; (2) the lymph circulation from the peritoneal to the pleural cavities through the stomata of the diaphragm; and (3) gravitation. The view most generally accepted today is that the force of gravity is responsible. When the patient lies on his back the kidney and the thick lumbar muscles form a mound between the subphrenic space and Douglas' pouch in the female and the retrovesical space in the male. Pus gravitates into the two depressions so produced.

In appendicitis the subphrenic space may be infected in the following ways: (1) as part of a general peritonitis; (2) by slow extension from the pelvis up the lumbar peritoneal fossæ; (3) through the portal vein as a pyelophlebitis; (4) by lymphatic extension up the retroperitoneal cellular tissue or up the lymphatics, around the deep epigastric artery, to the falciform ligament.

Infection by the peritoneal route produces intraperitoneal abscesses; by the cellular tissues, extraperitoneal abscesses; and by the lymphatic route, both types. Abscesses may contain pus or pus and gas. In unusual cases bile, fæcal and alimentary substances, pancreatic juice, and echinococcus hooklets have been found. The bacterium discovered most frequently is the bacillus coli. Streptococci, pneumococci, and staphylococci are less common and anaerobes are rarely present. Pus and gas are formed in about 25 per cent of the cases. Gas may have its origin in the intestine, stomach, or lungs or may be formed spontaneously. When it is of intestinal or gastric origin its presence in a subdiaphragmatic abscess is due to the perforation of a hollow viscus of the gastro-intestinal tract. When it is of pulmonary origin the abscess has ruptured a bronchus. When it is formed spontaneously it is usually due to fermentation.

The symptoms of subdiaphragmatic abscess may be acute or insidious. The general signs and symptoms include pyrexia, tachycardia, anæmia, emaciation, chills, and polymorphonuclear leucocytosis. In many cases a tumor is found in the hypochondrium or epigastrium and in some instances may be discovered in the lumbar regions. Because of adhesions, such a mass may be immovable. When gas is present liver dullness may be obliterated and replaced by tympany. In many cases it may be difficult to differentiate subphrenic abscess from general peritonitis, especially when pain, vomiting, and meteorism are prominent symptoms.

The thoracic signs are usually those of pulmonary compression. Consolidation of the lung tissue or empyema may be present and the heart may be displaced and even rotated. In the presence of gas, areas of tympany shifting with position may be made out. Dyspnœa, cough, and the expectoration of fœtid sputum may occur when the abscess ruptures into a large bronchus.

The complications may be classified as thoracic and abdominal. Thoracic complications include pleurisy, perforation of the diaphragm, rupture into the pleural cavity, rupture into the lung, and pericardial complications.

Pleurisy without perforation of the diaphragm may be fibrinous, serofibrinous, or purulent and may occur through the lymphatic anastomosis of the peritoneal and pleural cavities. Pneumonic patches lie adjacent to the subphrenic abscess. Perforation of the diaphragm occurs at the juncture of the costal and lumbar fibers in retroperitoneal abscess, while in cases of the intraperitoneal variety of abscess its site is usually the center of the diaphragm. The perforation may vary in size from that of a pinhead to that of a half dollar. The signs of rupture into the pleural cavity vary according to whether the pus is free or localized and whether gas is present or not. When the abscess ruptures near the center of the diaphragm the infection is usually walled off, but when it ruptures in the costophrenic space, adhesions are not common and empyema occurs. In the presence of gas the following zones are made out from above downward, with the patient in the sitting posture: (1) lung resonance, (2) dullness corresponding to the pleurisy, (3) tympany due to the gas of the abscess, and (4) flatness due to pus. Rupture into the lung may result in the formation of pneumonic patches, gangrene, or rupture into a bronchus. If there are adhesions between the diaphragm and the lung pus may escape directly into the lung without entering the pleural cavity. Pericardial complications can be demonstrated only by autopsy.

The abdominal complications of subphrenic abscess consist of: (1) peritonitis, which is rare; (2) rupture into the alimentary tract, which is fatal and associated with the vomiting of pus; (3) rupture into the bladder or a ureter, a rare complication; (4) an opening through the skin, usually in the right hypochondrium.

For the detection of pus below the diaphragm aspiration with a needle and syringe is indicated. The needle should be introduced at least 3 in., beginning in the tenth interspace in the scapular line. If pus is not found, other trials should be made consecutively in the ninth, eighth, seventh, and sixth interspaces from below up. If these also are negative, the needle should be introduced in the axillary line from below up. The roentgenogram is an invaluable aid in the diagnosis.

The prognosis depends upon whether the treatment is operative or expectant. In the author's opinion the treatment is entirely surgical. The posterior routes of approach are better than the anterior. The method of choice is the posterior transpleural method with resection of the rib. The diaphragm is fixed to the intercostal muscles with sutures and the abscess then drained. When the abscess points to the abdomen it may be opened in the midline or parallel to the ribs without entering the peritoneal cavity. In cases of retroperitoneal abscess the lumbar route is employed.

I. W. Bach.

Connell, F. G.: Abdominal Symptoms in Pneumonia. *Wisconsin M. J.*, 1920, xix, 279.

The diagnosis of pneumonia as appendicitis is probably much more frequent than the reported cases indicate. This mistake is due to the fact that in early pneumonia there may be abdominal symptoms in the form of sudden pain and tenderness while frequently during the first twenty-four hours the pulmonary symptoms and physical signs are absent. The abdominal symptoms are due to referred nerve impulses. The author discusses their mechanism.

In the diagnosis of abdominal symptoms, therefore, it is important to bear the possibility of pneumonia in mind, especially when the patient is a child. The X-ray will be found of great value as a diagnostic aid. K. L. VEHE.

Faschingbauer, H., and Eisler, F.: Diagnostic Experiences with Artificial Pneumoperitoneum (Diagnostische Erfahrungen mit dem artifiziellen Pneumoperitoneum). *Wien. klin. Wchnschr.*, 1920, xxxiii, 853.

Gas inflation of the abdomen as a diagnostic aid was first carried out by Weber, Lorey, Meyer-Betz, and Rautenberg. Rautenberg's work was confined to cases of ascites in which he supplanted the extracted fluid with oxygen. Goetze, who has done much to perfect the technique of the method, was the first to subject his technique to surgical tests.

Although the Viennese hospitals were rather conservative in taking up gas inflation, they now, as the result of considerable experience, have adopted a definite technique.

For several days prior to the examination the intestines are kept well evacuated; no food is given on the day of the examination and immediately before it the patient is directed to empty his bladder. A subcutaneous injection of morphine is given and the patient placed on an X-ray table which can be tipped to any angle. He is then screened in the dorsal position to ascertain the amount of gas in the gastro-intestinal tract. Unless contra-indicated by adhesions, the site of election for the inflation is about 3 cm. below the navel and through the center of the right or left rectus muscle. The solidity of the muscle at this site insures a good closure after the withdrawal of the needle. Under local anæsthesia a fine, sharp-pointed injection needle, 8 cm. long, is passed through the muscle. When it reaches the posterior sheath, which is determined by the increased resistance, the needle is connected witn a Franck pneumothorax apparatus which injects the gas under a pressure of 300 mm. of water. The rectus sheath and peritoneum are pierced and the gas allowed to enter the peritoneal cavity under observation with the fluoroscope.

From 1.5 to 3.1 liters are insufflated according to the size of the cavity, the tenseness of the abdominal walls, and the patient's sensitiveness. The needle is then removed. After the screen examination a slightly larger needle is introduced under screen control and the greater part of the oxygen is allowed to escape. Leaving the gas in the cavity causes considerable discomfort. Spontaneous resorption does not take place under from four to six days and in some cases not before several weeks.

Occasionally a slight increase in temperature was noted and in two cases a cutaneous emphysema resulted from the puncture. There is practically no danger of gas embolism or infection if the authors' technique is followed. Injury to the intestines at the site of adhesions is hardly possible if the insertion is made under screen control.

Insufflation is contra-indicated in the cases of patients with acute inflammatory conditions of the peritoneum and diseases in which an increase in the intra-abdominal pressure is undesirable.

The patient should be screened in various positions. First, with the head high and then low; second and third, in the left and right lateral positions with the same variations. The transition from one position to the other must be made slowly under continuous roentgenoscopy. Special attention should be paid to the various changes in form and position of the organs. The patient should next be rayed in the knee-chest position, right-left and left-right, and finally in the standing position.

For contrast the stomach is often distended with effervescent powder and the colon by insufflation. Various difficulties arise in the interpretation of the X-ray picture. Following the law of gravity and because of their own elasticity the organs often manifest changes in shape and position which make it difficult to distinguish between the normal and the pathologic.

Gas dilatation of the stomach and colon gives an unusual view of the liver, especially of the diaphragmatic surface. Its size and form are best judged with the patient upright. The right lobe is made out most clearly in the dorsal, left diagonal, or lateral positions. The left lobe is generally seen in the right diagonal upright position. If there are no adhesions, the organ is separated from the abdominal wall and diaphragm. The smooth surface of the normal liver is shown by very distinct shadow boundaries. The liver is very pliable and often, because of increased intra-abdominal pressure, may have an appearance suggesting a pathologic condition. An increase in size is readily made out. An increase in the consistency of the organ is expressed by a loss of the normal changes in shape; the upper surfaces retain their convexity.

Insufflation is of advantage from the diagnostic point of view chiefly in conditions difficult to recognize clinically, such as atrophic diseases of the liver. In atrophic cirrhosis the finely uneven surface of the liver causes the normally distinct margin of the liver shadow to become blurred. If a disease focus is situated near the surface of the liver, the procedure is a definite aid to diagnosis. It is of great value also in the search for metastatic growths but offers no special advantage in the diagnosis of diseases of the gall-bladder.

The spleen can be readily made out; the notch, the smooth posterior margin, and the hilus are not infrequently seen very clearly. This organ has not the pliability of the liver, and changes in size are readily discernible.

No distinct advantage has been gained from insufflation in the diagnosis of pathologic conditions of the gastro-intestinal tract. At times the lower portion of the stomach may be clear, but the fundus and cardia are generally not visible. If the stomach is dilated, its posterior wall may be seen above the liver shadow and peristaltic movements may be easily followed. Peristalsis at the antrum may be recognized by a gradually decreasing wave running toward the pylorus and disappearing at that point. If the pylorus is open it also appears in the form of a small ring. The combined method of gas distention and insufflation often gives valuable data in the diagnosis of gastrectasis and gastroptosis. The small intestines are generally forced into the lower abdomen by the gas and are not easily distinguished. The first part of the colon may be readily made out in the left lateral position, especially after contrast insufflation. The transverse colon is seen in the right lateral position. The descending colon is difficult to make out, as is also the sigmoid which in all positions is covered by the bony pelvis.

In the knee-chest position the mesentery of the small intestine spreads out like a fan. Normally it shows several strand-like thickenings. Shrinkage of the mesentery due to disease produces an irregularity in its outline; a loop of intestine may be drawn up and sharply kinked.

The pelvic organs may be demonstrated with the patient in the lateral position. The full bladder or enlarged uterus is easily recognized as are also the adnexa and tumors of the rectum.

Adhesions are very easily seen, especially if they connect the abdominal wall and one of the intraperitoneal organs. Adhesive perihepatitis and perisplenitis are usually diagnosed readily, but perigastritis and perisigmoiditis are made out with certainty only when there are adhesions to the anterior abdominal wall. In carcinomatosis of the peritoneum the areas of malignancy are often indicated by small dull spots.

Fluid in the abdominal cavity may be recognized when present in quantities not demonstrable by physical examination.

The kidneys may be distinguished at times by appropriate lateral raying. Anomalies in position and diffuse or focal enlargements were noted in a number of cases. Valuable information may be obtained with regard to diseases of the abdominal wall or diaphragm and various types of hernia.

In the dorsal, lateral, or upright position the diaphragm usually appears as a single line, or double lines several centimeters apart. At times it is seen in the form of many intersecting curves which probably signify a certain independence in the contraction of the various diaphragmatic parts. Small pleural effusions are easily recognized in the phrenocostal angle. Pleural adhesions as well as the contour and action of the heart are also demonstrable.

The method is easily carried out, and if care is used in the selection of cases it is not a dangerous procedure. The inconvenience to the patient is slight. Valuable diagnostic data are often obtained which at times are of such a nature as to obviate the necessity for an abdominal exploration. If properly indicated, the method should be employed as a diagnostic aid. A. J. SCHOLL, JR.

Jordan, A. C.: An Address on Stasis and the Prevention of Cancer. *Brit. M. J.*, 1920, ii, 959.

In connection with the theory that long-continued irritation is a cause of cancer the author brings forward the idea that the toxæmia of chronic intestinal stasis renders every body cell less resistant to cancerous change. The so-called "cancer diathesis" may be merely constipation, the true pathologic condition being torsion of the ileum, a kink, or a mobile cæcum. The tendency toward stasis may be overcome by medical, hygienic, or surgical means.

The beginning of stasis can be traced to an early period in life, often to infancy. Toxins produced in the lower ileum and cæcum enter the blood and may reach every cell in the organism. Bands form in the large intestine as the result of stasis and kinking from these may result in local trauma. Chronic catarrh constricts the lumen and may cause colitis. The latter and diverticulitis often precede cancer. Frequently the splenic flexure is kinked and at times a strong hepatocolic band distorts the transverse colon. It is noted that in feeble organisms the propulsive effort is slight and as the trauma is therefore less severe, cancer is less apt to develop than in more robust persons.

Kinks in the small intestine, however, seldom cause permanent obstruction but may produce ileal or duodenal stasis. In ileal stasis organisms from the lower ileum may enter the duodenum and cause ulcer. Duodenal ulcer occurs only when the duodenum is distended by a duodenojejunal kink. Pyloric spasm is induced by a distended duodenum. The onslaught of strong muscular waves at the spastic pyloric ring gives rise to congestion, and infection by organisms from the duodenum may thus result in gastric ulcer.

The formation of a gastric cancer is due to congestion of the lesser curvature by tension from a dropping, dilated stomach. The pyloric spasm and preceding duodenal distension are again the primary factors.

Œsophageal cancer may be produced also by congestion at the cardia due to the tension of a dropped stomach. The impact of food boluses at the tracheal bifurcation may cause œsophageal cancer at this upper site. The accessory glands, liver, and pancreas may become the seat of cancer as a result of congestion of their duct orifices and parenchyma by

duodenal distension. The liver receives the circulating toxins direct.

Congestion due to intestinal stasis and adherent bands plays an important rôle in cancer of the uterus and ovaries.

The author advocates the education of the public with regard to the evils of intestinal stasis and emphasizes the importance of surgical intervention when indicated to correct the condition.

J. W. Ross.

SURGERY OF THE EXTREMITIES

DISEASES OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC.

De Gaetano, L., and Scigliano, S.: Pyogenic Osteomyelitis Chronic for Forty-Three Years (Osteomielite piogena cronica 43 anni fin dall' inizio). *Riforma med.*, 1920, xxxvi, 757.

The patient was a man 60 years of age. At 11 years of age he suffered a traumatism between the middle and lower thirds of the left thigh. The limb was much swollen and painful but recovered under massage, etc. The patient's present condition he referred back to his sixteenth year when the injured region increased in size and became flexed. At this time, however, there was no fever or general disturbance. The swelling finally opened, giving issue later on to pus and blood. The condition became cured but recurred intermittently after periods of years during which the patient was able to attend to his work.

Examination and the Wassermann test showed that the patient had never suffered from syphilis. The cutaneous von Pirquet reaction was also negative and it was impossible to isolate the Koch bacillus. The limb was atrophied. The skin at the union of the lower and middle thirds of the thigh was discolored and on the internal surface gave issue to a yellowish discharge. Examination of the bone in this area showed an apparently limited partial necrosis and marked deformity of the lower third of the femur with considerable loss of substance. Macroscopically the fluid collected from the region appeared to be sterile pus. On culture the staphylococcus pyogenes aureus was obtained abundantly. A diagnosis of suppurative osteomyelitis due to the staphylococcus and chronic from its beginning was made.

A trephination of the lower extremity of the left femur was done and numerous sequestra were eradicated. Bacteriological examination of this material showed the presence of staphylococcus pyogenes aureus.

W. A. Brennan.

Goeldel, W.: The Causation and Treatment of Epicondylitis (Beitrag zum Wesen und der Behandlung der Epicondylitis). *Muenchen. med. Wchnschr.*, 1920, lxvii, 1147.

This article is a report on 22 cases of epicondylitis observed for a long period of time. The responsible factor was direct trauma in 6 cases and indirect trauma in 3 cases. In 10 cases no history of trauma was obtained. Five of the patients were men and 17 women.

Epicondylitis occurs not only in the external epicondyle of the humerus but also in other bony projections. In the cases reported the external epicondyle of the humerus was affected in 8, the styloid process of the radius in 9, the head of the fibula in 1, the median epicondyle of the femur in 3, and a metacarpal head in 1. In all these cases the three cardinal symptoms were elicited: (1) localized pain on pressure, (2) fatigue and weakness of the affected part of the extremity, and (3) functional disturbance. Inconstant symptoms were swelling, redness, and sensory disturbances. The X-ray picture showed no constant or characteristic findings.

In 2 cases the removed epicondyles were examined histologically; one consisted of lamellated bone and firm connective tissue with metaplastic bone formation, and the other of partially calcified cartilage and periosteal new bone formation of non-specific character. Apparently a calcification or ossification of cartilage tissue takes place in this condition. Epicondylitis at the styloid process of the radius may be confused with tendon-sheath inflammation or tendovaginitis stenosans (styloiditis), while in the upper arm it may be mistaken for neuromyositis.

Epicondylitis is a disease not easily influenced by treatment. Massage aggravates it. In cases in which the ordinary treatment—painting with iodine and the application of hot air—had no effect Goeldel obtained the best results with three or four injections of 70 per cent alcohol, these being supplemented with rest of the extremity and hydrotherapy during the night. If such measures fail, the author recommends the removal of the affected part under local anæsthesia. A pedunculated fat flap should then be sutured to the raw cartilaginous and bony surface so that the skin does not adhere to the bone. The traumatic form of epicondylitis heals much more quickly than the idiopathic form. Reinhardt (Z).

Collins, C. U.: Volkmann's Contracture of the Forearm. *Illinois M. J.*, 1920, xxxviii, 497.

A boy, 7 years of age, fractured both bones of the forearm and was treated with anterior, posterior, and interosseous splints. Three weeks later when the splints were removed, the result was apparently good. The thumb and fingers, however, began gradually to contract. Three months later a typical Volkmann's contracture developed with ulnar anæsthesia.

Because of the bony deformity of the ulna, the callus was sawed and the ends freshened and wired. At that time a small hæmatoma was found in the muscle and the muscle was transfixed in the callus.

Massage and manipulation given for two months resulted in improvement but extension was still impossible. All of the flexor tendons were then lengthened and this operation was followed by massage.

Sixteen years later the case was still under observation. There was complete restoration of function with no deformity. The patient was accepted into the army without question.

In the author's opinion there must be other causes for this condition besides tight bandaging. In the case reported it is probable that the hæmatoma and the transfixation of the muscles were important factors in the impairment of the circulation.

Collins compares the operation of lengthening tendons with the operation of shortening the bones. He considers the former much less formidable and the end-results more desirable. R. V. FUNSTEN.

FRACTURES AND DISLOCATIONS

Blake, J. A., and Worcester, J. N.: The Application of War Methods of Treating Fractures to Those Occurring in Industrial Occupations. *Minnesota Med.*, 1920, iii, 565.

The treatment by suspension with traction finds its greatest value in fractures of the long bones, particularly the femur and humerus. It is of great aid also in cases of fracture of the leg and certain compound fractures of the forearm but there are many fractures, such as the Colles' and Potts', which are more readily treated by other methods.

One of the greatest advantages of suspension for fractures of the femur and humerus is the fact that it gives better fixation of the fragments. To understand this principle thoroughly it is necessary to study closely the forces which tend to produce or restrain motion between the fragments. These forces may be intrinsic or extrinsic. The intrinsic, such as the force exerted by the muscles, tendons, etc., cause overlapping of the fragments, while the extrinsic, such as the force of gravity, cause angulation and improper fixation of the proximal fragment when the body is moved laterally.

When the proximal fragment is short in fractures of the long bones its position in relation to the body is determined by the contractions of the muscles inserted on it and is not influenced by extrinsic factors. The restraining action of the muscles which bridge the fragments is almost negligible and can be said to be exerted only when traction is made in the direction which the short proximal fragment occupies by reason of the intrinsic forces acting upon it.

Hence, as it is impossible to control the position of the proximal fragment in high fracture except to a slight degree, it is necessary to make the distal fragment conform to it. On account of the position of extreme abduction and rotation sometimes occupied by the proximal fragment, it is practically impossible in some cases to maintain the distal fragment in proper position by means of splints alone. By suspension, however, the limb may be placed in any position desired and traction may be applied in that position. When traction is applied to the distal fragment in a direction corresponding to the direction of the proximal fragment there is very little motion between them.

By the method described the greatest possible amount of motion is obtained in the joints both proximal and distal to the fracture. Counterpoised suspension allows the limb to swing freely except insofar as it is limited by the traction and at the same time permits the application of traction to the distal fragment itself. The fractured bone may move freely but the fragments retain their relative position.

The advantages gained by free movement of the joints of the injured limb are: (1) early active and passive motion; (2) improved circulation; (3) no stasis; (4) rapid disappearance of swelling; (5) shortening of the period of consolidation 25 per cent; and (6) shortening of the period of convalescence from 50 to 100 per cent.

Errors in the treatment are: (1) the use of incomplete apparatus; (2) improper traction in the wrong direction and in insufficient amount; (3) insufficient use of skeletal traction (tongs); (4) improper fitting of Thomas splints and non-employment of Pearson's leg piece; (5) failure to keep the supporting bands taut and pulleys running easily, and improper distribution of the weight.

In 30 cases of fractures, including 20 fractures of the femur and 10 fractures of the humerus, an excellent result was obtained in 27.

P. H. KREUSCHER.

Tzaico, A.: Temporary Osteosynthesis Effected with a Removable Internal Prosthesis (L'ostéosynthèse temporaire par prothèses internes amovibles). *Presse méd.*, Par., 1920, xxviii, 776.

An osteosynthetic method should give perfect immobilization of the bone extremities so that indirect retention by external apparatus will be unnecessary. The osteosynthetic apparatus should be simple and easy to apply and remove.

The author describes a method by which osteosynthesis may be effected with internal metallic plates. The essential parts of the apparatus described are: (1) a bayonet-shaped splint; (2) temporary screws; and (3) Juvara's automatic ligator. The bayonet splint is formed by a rectangular strip of nickeled steel 20 cm. long, 17 mm. wide, and 1 mm. thick. It is bent twice to the shape of a bayonet. The first portion is applied along the bone at the site of fracture. The second, which is bent at an obtuse angle to the first portion, passes through the soft parts. The third part forms the sleeve of the splint by which it is extracted when consolidation of the fracture has been obtained. The splint proper is curved according to the shape of the bone surface and is perforated with four holes, two for wire ligatures and two for the passage of fixing screws of nickeled steel varying in length according to the thickness of the tissues covering the bone. Juvara's

automatic ligator effects a perfect ligation with metallic wire encircling both the bone and the splint. After consolidation of the fracture it allows the extraction of the wire without operation. The bone extremities and the splint are so tightly held that they are completely immobilized.

After reduction of a fracture the coapted bone extremities are kept in position by an assistant with a Faraboeuf separator, the large blade of which is passed around the fracture. The first part of the metallic splint is then fitted over the site of the fracture and fixed along the bone by means of the screws. The wire ligatures are then applied. The screws are placed in the normal bone as far as possible from the site of fracture. Indirect contention of the fracture by plastic apparatus when the operation is completed is absolutely unnecessary. The wound is sutured, openings being left only for the screws, the ligatures, and the sleeve of the splint, and is covered with a sterile compress. When consolidation is effected, the screws, ligatures, and metallic splint can be removed easily without causing pain.

The author states that the results obtained by his method are the best that can be obtained by osteosynthesis. Coaptation and immobilization are perfect; consolidation is effected with the least delay and without the least shortening. As plaster appliances are unnecessary, the joints are free and there is no stiffness or ankylosis. The splint issuing through the tissues acts as a drain and prevents sepsis.

An illustration shows schematically the application of the bayonet splint in the case of a transverse fracture of the femur.

W. A. BRENNAN.

Henderson, M. S.: Old Fractures. *J.-Lancet*, 1920, n.s. xl, 687.

Old fractures may be defined as those which are troublesome beyond the time ordinarily allotted for the return of function. The reason may be malunion, delayed union, non-union, limitation of joint motion, ischæmic paralysis, a local manifestation of a general condition, such as carcinomatosis, tabes dorsalis, the various forms of osteomalacia, or a complication of a local bone condition such as sarcoma or fibrocystic disease.

Anatomical malunion does not necessarily impair function. The loss of proper alignment in the lower extremities is apt to cause more disability than malunion in the upper extremities. The shortening and static arthritis due to faulty weight-bearing may cause much disability, especially in the femur.

The disability following a Pott's fracture is usually due to valgus position of the foot and can be corrected only by osteotomy of the fibula and the internal malleolus and replacement of the astragalus near its normal position. Posterior displacement of the astragalus due to crushing of the astragalus or the posterior articulating surface of the tibia is best treated by astragalectomy or arthrodesis.

In the treatment of malunion the question is not one of obtaining union, but of correcting deformity. The normal line of weight-bearing should be restored and the fragments held in position. Foreign materials for internal fixation should be used only when absolutely necessary, the absorbable materials being much preferable. Should non-absorbable material be necessary, the patient should be informed that in all probability such material should be removed as soon as it has served its purpose and union is firm. Beef-bone plates and screws are of value as they are readily absorbed (Figs. 1 and 2).

Cases in which a fracture shows continued evidence of callus formation without actually becoming solid after the normal time for union has passed are classed as cases of delayed union. The false motion may be so slight that only the patient himself can detect it. Although as a rule union can be secured in these cases by conservative measures, it can be hastened by operation. Perhaps the most frequent causes of non-union are the interposition of muscle or fascia, insufficient fixation, and repeated and too frequent examinations. The author does not believe that syphilis or X-ray exposure plays as large a part in the etiology of delayed or non-union as is generally supposed.

Cases of true non-union may be of ten to fifteen years' duration and show no callus formation; operation offers the only chance of restoring function. The humerus is most often involved in non-union; delayed union occurs most frequently in the tibia. Non-union occurs frequently also in fracture of the neck of the femur because of the difficulty of maintaining apposition. The methods of treating cases of non-union and delayed union are similar, but it should be remembered that it is much more difficult to secure union in the non-union group of cases. In both instances the use of the inlay or massive graft is the method of choice. Osteoporosis is a serious obstacle and should be overcome before operation by stimulating the production of bone salts by use of the extremity. A side-to-side approximation or a mortice may be sufficient in cases of delayed union, but in true non-union it is safer to

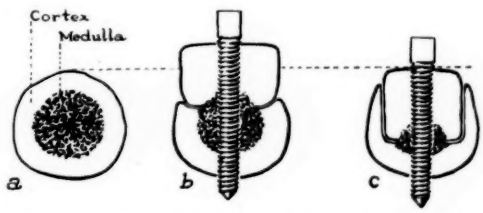

Fig. 1. *a*, Transverse section of bone. *b*, Large bone graft shown in apposition to fragment from which part of the cortex has been lifted to permit broad contact of the graft with the fragment; held in place by beef-bone screw through opposite cortex. *c*, Inlay method; beef-bone screw placed through the graft and opposite cortex.

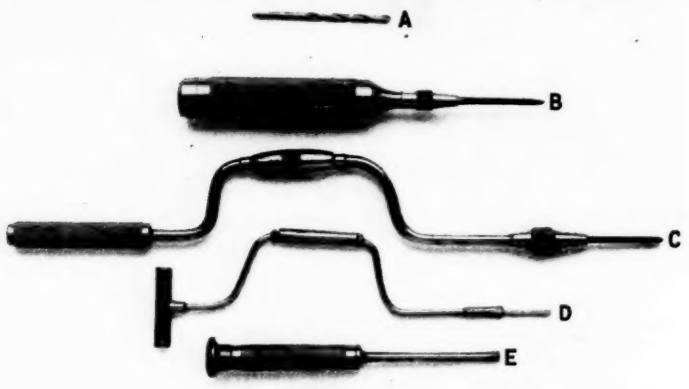

Fig. 2. Instruments necessary for the placing of beef-bone screws: A, No. 17 twist drill; B, straight handled 10x24 tap; C, offset handle 10x24 tap; D, offset handle wrench with hexagonal headed beef-bone screw in socket; E, straight handle wrench.

(*Old Fractures — M. S. Henderson*)

use a large bone graft which will insure mechanical fixation until new bone is formed.

Limitation of joint motion due to loss of elasticity of muscles will yield to activity. When due to degeneration of the muscle fibers the stiffness is apt to be permanent. Baking and massage are valuable, and the tendons may be lengthened. When the condition is due to exuberance of callus, the removal of the obstruction is indicated.

Ischæmic paralysis is to be avoided by care in the application of casts and splints and in rare cases by relieving the pressure from hæmorrhage within the extremity itself by multiple small punctures.

Pathologic fractures occurring in cases of carcinoma, sarcoma, and tabes dorsalis are treated first with regard to the general condition. Fibrocystic disease rarely causes non-union.

J. I. MITCHELL.

Rotter, H.: Fractures of the Lower End of the Radius (Ueber Frakturen des Radius am unteren Ende). *Deutsche Ztschr. f. Chir.*, 1920, clvi, 235.

Fracture of the radius is the most common fracture of the arm and of all fractures. From a review of the literature the author finds that the mechanism of fracture has been variously interpreted. At first the theory of coup and contrecoup was prevalent. Later this was displaced by the "tearing-off" theory. Subsequently a combination of the two theories was accepted. Some authors attribute fracture of the radius to the force exerted by the carpus.

Rotter regards the radius as a more or less elastic rod upon which the fracturing force is exerted by the extended hand under the weight of the body. A fall upon the hand tends to bend the forearm. In an oblique fall epiphyseal separation may occur.

From the mechanism of fracture conclusions may be drawn regarding the therapy. The fractured ends must be placed in the best possible coaptation in such a position that redislocation will be impossible and the neighboring joints are in median position. In the past the last requirement has not been adequately met. Coaptation of the fractured ends the author obtains by placing the forearm upon the edge of a table and producing dorsiflexion of the hand (short, sharp movements) followed by traction on the hand and pressure upon the ulna. He then makes continuous traction and rotation toward pronation. Ethyl-chloride anæsthesia is used. The arm is then placed in pronation upon a Cramer splint with slight dorsiflexion of the hand. Early movement is possible and the splint is removed in three weeks. The various stages of reposition may be varied according to the mechanism of the fracture. E. GLASS (Z).

Mueller, H.: The Forms of Fractures in the Lower Third of the Forearm (Ueber die Formen der Vorderarmbrueche im unteren Drittel). *Deutsche Ztschr. f. Chir.*, 1920, clv, 267.

Mueller reports 134 fractures in the lower third of the forearm. Seventy-six were in the right arm and 58 in the left. Fracture of the radius alone was more common in the male than in the female (93:41). Thirty-nine per cent of the fractures occurred during the first and second decades of life. By means of the X-ray it was shown that 108 fractures of the radius alone occurred near the lower epiphyseal line and 26 above it. Of 108 fractures of the radius alone 83 were located at the typical site. A very

frequent complication, fracture of the styloid process of the ulna, was present in 63 cases (47 per cent). Among 89 transverse or oblique fractures of the radius it was present in 42 (47 per cent). Epiphyseal separation occurred in 19 cases.

In conclusion the author states that the typical fractures of the radius, supracondylar fractures, and epiphyseal separations may be included in one large group on the basis of their traumatic etiology. The styloid process of the ulna was fractured in about one-half of the cases (47 per cent). The fracture occurs at the base of the styloid process. In adults the fracture at the epiphyseal region is typical but in children supracondylar fracture and epiphyseal separation occur most frequently.

KOLB (Z).

Zuccari, F.: The Mechanism and Evolution of Fracture of the Carpal Scaphoid (La frattura dello scafoide del carpo; suo meccanismo ed evoluzione). *Clin. chir.*, 1920, n.s. ii, 686.

Isolated fractures of the carpal bones are extremely rare. Isolated fracture of the scaphoid Bardenheuer and others believe is due to direct action. Bouchet and Zuccari have caused it experimentally. Such a fracture may be produced by a violent blow on the thenar eminence of the hand when it is in dorsiflexion and by a fall on the palm or on the back of the hand when it is in exaggerated extension or flexion. In a study of these two movements and the action of the ligaments the author found that the theory attributing the fracture to crushing is more probable than the theory ascribing it to drawing up of the ligaments.

Apart from its relation to the neighboring bones, the form and structure of the scaphoid increase its liability to fracture. In exaggerated extension of the hand the scaphoid is acted on by two opposing forces, one proceeding from the trapezium and trapezoid, which acts dorsally, and the other being palmar. Fracture is favored also by the change in the position of the scaphoid in exaggerated extension of the hand. In exaggerated palmar flexion the carpal extremity of the scaphoid, drawn by the second row of the carpals, tends to become displaced forward and to emerge from the glenoid cavity where it is held by its connections to the other bones of the first row of carpals and especially by the tendon of the long extensor of the radius. Under such circumstances fracture may be due to crushing or flexion of the bone on its concave side.

The author studied also the behavior of the fragments and the mechanism of displacement. He explains 3 cases which he observed. In 1 of these the fracture was strictly transverse, the fragments remaining almost in contact and suggesting physiological division of the bone.

In the evolution of the fracture the production of callus is always slight, being hardly sufficient to close the cavity in the spongy portion of the bone. Because of this fact and trophic alterations, rigidity of the hand results.

W. A. BRENNAN.

Speed, K.: Tendon Transplantation for Wrist-Drop. *Surg. Clin. Chicago*, 1920, iv, 1139.

In 1916 Speed described an operation for the temporary relief of paralysis of the musculospiral nerve. This operation was devised in France during the war and was intended for the treatment of suppurating wounds which precluded early nerve suture. The new method described in this article Speed believes has more advantages than the operation previously recommended.

The flexor carpi ulnaris, supplied by the ulnar nerve, takes over the work of the extensors, including the thumb. The flexor carpi radialis, supplied by the median nerve, acts vicariously for the extension and abduction of the thumb, and the supinator, which is supplied by the ramus profundus of the musculospiral nerve, takes up the slack of the belly of the common extensors and reinforces the normal action which has been established by the transplantation of the flexor carpi ulnaris at the wrist.

The technique of the operation is described in detail.

E. C. ROBITSHEK.

Whitman, R.: The Abduction Treatment of Fracture of the Neck of the Femur. *N. York State J. M.*, 1920, xx, 386.

The abduction method utilizes the mechanics of the joint to correct deformity and to fix displaced fragments in apposition. The patient under anæsthesia is placed upon a pelvic support provided with a perineal bar. If the fracture is complete, the shortening is reduced by direct manual traction on the extended limb after the trochanter has been lifted to the normal plane and at the same time rotated inward so that the fragments are opposed. Both limbs, extended and under manual traction, are then abducted to the full limit, on the sound side first, to demonstrate the normal range and to balance the pelvis. When this limit is approached on the injured side the tension on the capsule brings the fragments into alignment in a horizontal plane and finally forces the neck fragments against the inner and resistant head fragment. A long plaster spica is then applied which, by fixing the limb in complete abduction, extension, and slight inward rotation, insures the continued effectiveness of the anatomical splinting.

If the fracture is incomplete or impacted, the neck in its relation to the shaft is usually displaced backward and foreward, and whenever the deformity is sufficient to impair the normal range of motion seriously it should be corrected. The displaced neck is in a relation to the acetabulum which, under normal conditions, would require abduction and inward rotation of the shaft. To correct the deformity, therefore, one must adjust the shaft to the neck by inward rotation and abduction of the limb.

The subsequent treatment is the same for all forms of fracture, i.e., the head of the bed is raised to increase the blood supply to the fracture area and

thus favor repair. The patient may be turned from side to side or completely over to the ventral position without danger, and may be transported daily to the open air. The spica is retained for from eight to twelve weeks or until it may be assumed that union is sufficiently firm to permit movement of the limb. The patient then should remain in bed, if possible, and devote several weeks to muscle re-education and the restoration of motion in the joints. Weight-bearing should not be permitted until free and painless movement and the X-ray examination indicate stability of repair. If early locomotion is desired a protective hip brace should be provided.

The advantages of the abduction method are: (1) the patient does not require hospital treatment, (2) the apparatus necessary is simple and may be improvised, (3) the qualifications of the surgeon are not exacting.

Advanced age does not contra-indicate the use of this method for the author believes that the efficient treatment of the fracture lessens rather than increases the danger to life.

The traction method of treating fracture of the neck of the femur is unreliable as it does nothing more than relieve symptoms and results in functional disability due to uncorrected deformity. The mechanism of the abduction treatment is the anatomy of the hip joint, and the limb is fixed in the attitude which makes the internal splinting effective.

R. S. REICH.

Robert, A. E.: The Treatment of Diaphyseal Leg Fractures by Encircling the Tibia According to the Putti-Parham Method (Le traitement des fractures diaphysaires de la jambe par le cerclage du tibia suivant la méthode de Putti-Parham). *Rev. méd. de la Suisse Rom.*, 1921, xl, 782.

This article deals with the treatment of oblique or V-fractures of the tibia which occur at the juncture of its middle and lower thirds, the weakest point. In such a fracture with great displacement the different methods of reduction which have been devised give only imperfect results. When there is much displacement, therefore, the author prefers osteosynthesis effected by encircling the tibia with a metal strip according to the Putti-Parham method. This operation is best done between the fifth and the seventh days following the traumatism.

The only inconvenience due to the method is that long after recovery there may be a slight reaction due to the retention of the metal strip. This is very rare, however, and when it occurs an opening may be made under anæsthesia and the metal strip removed as it is no longer required. The advantages of the method are summarized as follows:

1. It prevents pseudarthrosis due to muscular interposition which is frequent in oblique fractures with marked displacement of fragments.

2. The patient is able to walk with the aid of Delbet's apparatus in about three weeks.

3. The immediate functional results are better than those obtained by any other method. There is no shortening, the static axis is normal, and there is no stiffness of the tibiotarsal articulation.

4. Sequelæ such as persistent œdema and vascular and nerve disturbances are prevented.

W. A. BRENNAN.

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC.

Bosch Arana, G.: Osteosarcomata of the Radius Treated by Resection and Fibular Grafts (Osteosarcomas del radio tratados mediante la resección y el injerto óseo peroneal consecutivo). *Semana méd.*, 1920, xxvii, 601.

The author treated two cases of osteosarcoma of the radius by resection of the tumor *in toto*, sectioning the bone in healthy areas and removing the mass without opening it. Later the bone deficiency was replaced by a bone graft taken from the leg.

Both tumors were encapsulated. In the first case the graft was placed forty-five days after the primary operation for the removal of the tumor. In the second case the tumor was completely removed and the graft cut and placed during the same operation. In both instances the graft took and good function of the fingers was obtained. In the first case, however, there was some tendency to external subluxation of the carpus. This was remedied by a slight operation. In the second case the graft was displaced by a pseudarthrosis which developed between the graft and the radius. The author endeavored to overcome this defect by means of a periosteal graft taken from the ulna. He was not successful, however, and the patient is obliged to wear an orthopedic brace.

The conservative treatment of osteosarcoma by resecting the tumor and bone grafting is applicable only to cases of encapsulated tumors. When the soft parts are invaded amputation is indicated.

W. A. BRENNAN.

Ely, L. W.: An Operation for Tuberculosis of the Wrist. *J. Am. M. Ass.*, 1920, lxxv, 1707.

The author refers to a cardinal rule which he laid down ten years ago that the proper way to cure a tuberculous joint in the adult is to destroy it.

In the operation described an incision 8 to 10 cm. long is made from the middle of the third metacarpal bone to a point 4 cm. proximal to the wrist joint on the radius, passing over the wrist at about its center. The incision is deepened and the extensor tendons are retracted. The periosteum is also incised and stripped back. With a motor saw two parallel cuts 5 cm. long and 5 mm. wide are made, running through the wrist joint into the radius and into the third metacarpal bone for a distance of about 1 cm. A graft measuring 4 by 0.5 cm. is then taken from the tibia and fitted into the groove. When the wrist is forced into extension the graft locks fast. The graft is sutured in place and

the skin is closed. The wrist is fixed in hyperextension in plaster of Paris with the fingers and thumb free. Considerable swelling need cause no anxiety if the plaster dressings are slit. Fixation of the wrist should be maintained for about three months.

The result is a useful hand possessing as much rotation as before the operation and excellent power in the fingers and thumb.

Ely reports two cases in which he has obtained very good results with this operation.

F. G. MURPHY.

Kanavel, A. B.: The After-Treatment of Infections of the Hand. *Surg. Clin. Chicago,* 1920, iv, 1165.

According to Kanavel the most valuable asset of the working man is his hand. Therefore, in infections of the hand it is the surgeon's duty not only to control the infection, but to see that proper and adequate after-treatment is carried out. The first consideration in the operative treatment of infections of the hand is to make incisions in the proper location and of sufficient length to evacuate the pus. Of equal importance in the restoration of function is the after-treatment, which involves the use of active and passive motion, hot baths, dry heat, massage, suitable splints, and other mechanical aids.

In this article Kanavel reports 3 cases of hand infection. The first patient came to him five days after the development of an infection of the tendon sheaths of the thumb and little finger which rapidly involved the ulnar and radial bursæ and was followed by the formation of a secondary abscess in the forearm. An operation was performed and after-treatment immediately instituted, with the result that the patient is now able to extend and flex fully all the digits except the little finger. He has no limitation of motion at the wrist, and except for slight limitation of extension of the little finger which does not incapacitate him, he has regained complete function of the hand.

The second patient suffered from a severe infection of a similar nature which had been treated by inadequate incision and without adequate care after operation. He came to the author about a year after the infection with extensive adhesions and contractures.

The third patient suffered from a similar trouble but it did not involve the whole hand.

Clinically there are two common types of hand infections, those due to the streptococcus and those due to the staphylococcus and similar organisms. In both types it is of the greatest importance that active and passive motion should be begun as soon as possible after drainage has been instituted. In a case of staphylococcus infection the patient should be urged to use his fingers for ten or fifteen minutes two or three times a day—flexing, extending, adducting, and abducting them—at the end of thirty-six hours or, at the most, forty-eight hours. If the infection is due to the streptococcus it may be advisable to delay active and passive motion for twenty-four hours more. If the patient's temperature should rise after manipulation of the hand, passive and active motions should be delayed for another twenty-four hours and then carried on very gently.

After forty-eight or seventy-two hours an arm bath, large enough to permit complete immersion of the hand and forearm, may be substituted for the hot dressings used immediately after operation. The entire hand and forearm should be kept in the bath for twenty minutes two or three times a day, during which time the patient should move his fingers both by active contraction of the muscles and with the help of the other hand. The water should be as warm as can be borne comfortably.

At the end of from four to six days it will be found advisable to decrease the interval during which the hand is immersed and to expose the infected hand immediately after the bath to the rays of an electric light which will thoroughly dry the skin.

If the original incision has been so made that the tendons have a tendency to prolapse, it is advisable to apply a dorsal splint during the time that the hand is not being exercised. In the author's opinion the commonly seen permanent flexion at the wrist joint, particularly that associated with adduction or abduction, is due to the fact that the patient's hands were bound up for a considerable period of time with dressings and no attention was paid to proper after-treatment.

Within ten days or two weeks it will be found that the methods outlined do not adequately meet the problem in these cases. In order to maintain the patient's interest and to ensure steady progress in the restoration of function the use of a number of various mechanical devices has been suggested. Among the most valuable devices available are the different types of rollers for the patient to rotate so as to raise or lower the weights which are attached. Those constructed of cylinders of varying sizes are the most effective as the patient is constantly encouraged to flex his fingers about the smaller cylinders. Another valuable device is a glove so constructed that it holds the fingers in a position which prevents contraction in an improper position and permits the patient to grasp different types of objects.

For exercising the fingers, practising on the piano or typewriter is particularly valuable. For exercising the fingers and wrist, tennis, Indian clubs, hand-ball, golf, indoor ball, volley ball, and bowling are helpful.

When there are abscesses in the hand which do not involve the tendons it is possible to secure complete restoration of function within a month. When the tendon sheaths have been involved, a longer period of time is generally necessary if there has been delay in the treatment; 85 per cent of function should be secured within four months, 95 per cent within six months, and in favorable cases 100 per cent within a year.

Another group of patients are those with infections in the hand which have been improperly treated and

who present themselves with stiff. claw-like fingers and hands, ankylosis at the joints of the hand and wrist—in short, with an insensitive and an altogether useless member.

In such cases the median and ulnar nerves are frequently involved in the suppurative process. In the more complicated cases the tendons at the wrist joint will be found to be one indistinguishable mass of scar tissue.

Operative treatment should not be attempted unless the surgeon has accurate knowledge of the anatomy of the hand, particularly the distribution of the nerves and the relations of the nerves and tendons. It is not wise to promise a patient any benefit from the operation. It is better to promise little and do more than to promise much and do less.

G. W. HOCHREIN.

Descomps, P.: Section of the Soft Parts and the Bone in Limb Amputations (Taille des parties molles et taille du squelette dans les amputations des membres). *Rev. de chir.*, Par., 1920. xxxix. 379.

Removal of a limb presents a double problem: section of the soft parts and section of the bones. Usually the two procedures are considered as closely related, a certain method of sectioning the soft parts being always thought of in connection with a certain method of sectioning the bone. This assumption robs amputation of much of the elasticity which is desirable.

For every region of the limbs there is in reality an optimum method of sectioning the soft parts and an optimum method of sectioning the bones, and these do not necessarily correspond.

From this point of view the author discusses at length and illustrates amputations in various portions of the upper and lower limbs based particularly on experience gained during the recent European war.

W. A. BRENNAN.

Hedri, A.: The Treatment of Transverse Nerve Sections in Amputation Stumps (Zur Behandlung des Nervenquerschnittes bei Amputationsstuempfen). *Muenchen. med. Wchnschr.*, 1920, lxvii, 1148.

Following the amputation of an extremity unpleasant sensations are often referred to the fingers or toes and may become aggravated into severe pain. Investigations carried out by the author have shown that if these sensations come on early after an amputation they will probably persist and prevent the use of an artificial limb as even touching the stump elicits lightening-like pain in the extremity. Wilms attributes this sensibility to the secretion present in wounds not healing by primary intention which irritates the nerve ends.

Until the neuroma formation of cut ends was recognized the later sensibility of stumps was attributed to scar involvement of the nerve ends. Krueger has shown that the important factor is the defect in the nerve sheath which does not regenerate with the regeneration of the nerve fibers so that the nerve is not surrounded by perineurium. To remedy this many methods have been devised. Krueger recommends the crushing of the nerve stem to prevent the growth of the axis cylinder beyond the nerve sheath. This method has been used extensively but as it also may fail the author presents a new method which prevents neuroma formation entirely or delays it at least until the wound is healed. He accomplishes this by burning the nerve ends with the thermocautery and sparing the less sensitive perineurium.

Following this procedure a scab forms on the nerve fibrils so that the nerve ends are protected from the irritating wound secretion and the regeneration of the nerve fibrils is delayed until complete healing of the wound has taken place. Hedri has obtained excellent results with this method. Laewen's ice method has also given good results but is unsatisfactory in the treatment of larger nerves as the cold does not penetrate sufficiently.

GANGL(Z).

David, V. C.: The Treatment of Acute Suppurative Arthritis of the Knee Joint. *Surg. Clin. Chicago*, 1920, iv, 1253.

The case reported was that of a laborer, 40 years of age, who entered the hospital because of bilateral swelling of the knees and the legs below the knees which came on just as an attack of bronchopneumonia was subsiding. The swelling was acute in onset and was associated with marked pain on movement.

The patient's temperature was slightly elevated and his pulse rate varied from 100 to 110. On examination of the chest a few râles were heard over the base of both lungs, but there was no evidence of consolidation. The urine was negative and the leucocyte count 14,000. Both knees were markedly swollen, but the skin was not reddened. On both sides the patella was floating and the quadriceps bursa was so distended that it could be plainly outlined up to the lower third of the thigh. Below the knees. the legs and ankles were swollen. The ankles were painful on motion, but no fluctuation was present over them. The skin was not hyperæmic, but pitted easily on pressure. An aspirating needle attached to a Luer syringe was inserted into each knee joint, beginning high up along the outer aspect. On both sides a creamy yellow pus was withdrawn which on culture showed colonies of streptococcus hæmolyticus.

A long parallel incision was then made on both sides of the patella, beginning just below the inferior border of the patella and extending to the upper limit of the quadriceps bursa. Each incision was about 8 in. long. The blood vessels in the cut quadriceps muscle were cut and ligated and into each wound a long strip of vaselined gauze was inserted to prevent the recently cut edges from adhering to each other and thus obstructing drainage. No drainage material was put into the joint. A gauze dressing

was placed over the wound and a towel slipped under the knee and loosely pinned over the dressing. Each knee was supported in a Hodgen splint which was slightly bent, and both splints were suspended on a Lyle frame and counterpoised so that the patient could raise himself up without bending the knees. To facilitate motion of the joints an adhesive plaster strip was attached to the sole of each foot and connected with a pulley on the frame by a rope. This rope was run through another pulley just above the patient's head and then allowed to hang down so that the patient could reach it with his hand. By pulling on the rope the knees could be extended in the Hodgen splints.

In ten days the knees were taken out of the splints and allowed to rest on the bed. The adhesive was removed from the soles of the feet and the rope upon which the patient pulled to exercise the knees was attached to a canvas which ran under each knee. Traction on the rope caused flexion of the knee. At the end of three months the knees had about 40 degrees of flexion and full extension.

G. W. HOCHREIN.

Elmslie, R. C.: The Principles of Treatment of Congenital Talipes Equinovarus. *J. Orthop. Surg.*, 1920, n.s. ii, 669.

The author emphasizes two points in the treatment of congenital talipes. The first is that more consideration should be given to the resulting functional use of the foot than to the apparent correction of the deformity, and the second, that when a cutting operation is necessary the procedure adopted should be based upon the known pathological anatomy of the deformity. In Walsham's description of the pathological anatomy cases are grouped into two classes: (1) cases of congenital club-foot in children who have never walked, and (2) cases of relapsed and inveterate club-foot in which the foot has been walked upon in the deformed position.

The chief factor in the various types of deformity is displacement of the scaphoid and cuboid inward at the mid-tarsal joint with rotation of the os calcis bringing its anterior extremity downward and inward. The astragalus lies in a position of plantar flexion at the ankle joint. The most striking abnormality is increased obliquity of the neck of the bone downward and inward. The degree of this obliquity may be measured. The os calcis lies obliquely. Its posterior end is tilted upward and outward so that it lies nearer the external malleolus than in the normal foot. The anterior extremity points downward and inward and is twisted so that the outer surface lies underneath. The articular facet for the cuboid, therefore, points more inward and downward and less directly forward than in the normal foot.

This description applies to the chronic club-foot in which the varus element of the deformity is due in large part to subluxation inward of the scaphoid and cuboid and in smaller part to an alteration in shape in the astragalus and os calcis. The author discusses here the importance of the ligamentous structures in reference to the deformity, especially the astragalo-scaphoid capsule.

In the club-foot of the young child the changes mentioned are all present. In the infant most of the deformity is due to the displacement at the ankle joint, subastragaloid joint, and midtarsal joint, only a small part being due to changes in the neck of the astragalus in the anterior part of the scaphoid. Resistance to correction is formed largely by the astragalo-scaphoid capsule, the plantar fascia, and the tendo achillis. In inveterate cases the importance of the astragalo-scaphoid capsule is very much greater, and, in addition, the displacement of the anterior articular fascia of the os calcis on the inner side of the bone is very important because of the difficulty of replacing the cuboid on the os calcis.

Regarding treatment the author claims that tenotomy has been too freely employed. In most of the cases of children under 1 year of age correction can be obtained by simple manipulation under an anæsthetic, repeated if necessary several times, and retention of the foot in plaster of Paris between manipulations. Elmslie describes his method of manipulation and application of plaster of Paris in detail.

It is essential that the steps in the correction of club-foot should be in the order described. First, the sole should be flattened. The abduction of the fore part of the foot must be completed before the equinus portion of the deformity is corrected. This last is very important. Premature correction of the equinus by division of the tendo achillis leaves an imperfect foot which is very apt to relax and exceedingly difficult to correct satisfactorily by any subsequent operation.

Relapses occur in the practice of all surgeons, and are due either to imperfect correction or to inadequate attention to the after-treatment. As a rule a relapse is due to failure to overcorrect the varus part of the deformity in the first stage of the treatment. The author cites the various accepted methods of treating relapsed cases of club-foot. Many of them he criticizes as too radical and destructive. Phelps' operation is especially cited. Astragalectomy (Lund) Elmslie considers an operation of poor judgment as it is a well-known fact that following this procedure the foot has a tendency to turn to the varus position.

The method of treatment advocated by Elmslie in cases of severe club-foot in older children or adults is as follows:

At one or two sittings an attempt is made to manipulate the foot into shape until the maximum correction has been obtained. As soon as this is evidenced, an open operation is performed to remove all obstruction to complete correction of the varus part of the deformity. The obstructions are: (1) the astragalo-scaphoid capsule, including the anterior part of the interior lateral ligament and the

attachment of the tibialis posticus tendon, (2) the displacement inward of the cuboid on the os calcis, and (3) the inward and outward obliquity of the neck of the astragalus and the anterior part of the os calcis.

In concluding his article Elmslie again emphasizes the importance of avoiding division of the tendo achillis and the fact that the Phelps' operations, astragalectomy and tarsectomy, are unjustifiable. Astragalectomy is an operation which is based on unsound ideas regarding the pathology of the condition. L. D. PRINCE.

ORTHOPEDICS IN GENERAL

Scheimberg, H.: The Weak Foot in the Child. *N. York M. J.*, 1920, cxii, 988, 1026.

Persistant pain is often absent in weak foot in childhood. This is in a way unfortunate because attention is not drawn to the condition. When pain is present it is usually regarded as "growing pain." Such objective symptoms as round shoulders, protruding abdomen, clumsiness in action, and frequent falling are often associated with weak feet and are more prominent than the foot symptoms.

In the treatment, operative surgery is contraindicated, not only because of the danger of interfering with bone growth but because excellent results can be obtained by more conservative measures. The use of plaster of Paris or adhesive plaster to hold the foot in supination is also unnecessary because there is no shortening or spasm of the peronei muscles and such immobilization defeats the possibility of restoring function which is best secured by mobilization.

Successful treatment demands attention to: (1) attitude, (2) footgear, (3) exercises, and (4) the prevention of deformity.

Improper standing or walking may be secondary to postural defects other than those of the feet.

Flexible shank shoes and sandals are not indicated for the foot of a child. The contention that such shoes are rational because they allow natural function of the foot does not take into account the fact that most of our walking and standing is done on hard pavements not designed by nature. Proof is lacking that a well-fitted rigid shank shoe interferes with function. In addition to a properly fitted shoe which does not cause abduction of the great toe, the stocking also should be fitted with the same object in view. In weight-bearing the great toe naturally tends to adduct somewhat from its relaxed position because of contraction of the flexor longus hallucis. Most stockings tend to prevent this adduction. The ideal stocking should have a separate stall for the great toe.

Exercises should have for their object the inversion of the entire foot at the ankle and adduction of the forefoot. It is a good plan to make them interesting to the child in various ways such as having him rotate the foot around the nurse's finger. Special care should be taken to have the feet exercised either actively or passively if the child is confined to bed on account of illness. This is necessary in order to preclude an equinus deformity due to continued extension.

In some cases physiological treatment cannot check a faulty balance. Resort must then be had to the use of rigid supports to restore the balance, discarding them after this aim has been attained. A metal support should produce pressure on the inner upper and lower outer aspects of the os calcis. The Whitman plate made over a plaster model of the foot is recommended for this purpose.

W. A. CLARK.

Clark, W. A.: A System of Joint Measurements. *J. Orthop. Surg.*, 1920, n.s. ii, 687.

In the literature the limits of motion and angles of deformities in joints are expressed variously. It is often impossible to say whether the angle mentioned is the angle included between two bones or the angle between one bone and an imaginary line projected from the other; the record is often ambiguous. Hence Clark attempts to standardize the measurement of angles in joint deformities by a rational system in which the arc of the angle included between the bones on either side of the joint is used to express the limits of motion or the angles of deformity, complete extension being 180 degrees. Any movement beyond 180 is recorded as hyperextension and regarded as analogous to flexion but in the opposite direction. Such movement may be expressed, for example, as "hyperextension to 170 degrees."

In this system the stated number does not represent the number of degrees through which the part has moved, but the angle on the scale from 0 to 180 where it stops, i.e., it indicates the limits of motion but not the amount.

Flexion is the movement in an anteroposterior plane in the direction of its greatest range, beginning at 180 and approaching 0; for example, "flexion to 80 degrees." Abduction starts at 180 and implies a movement away from the median line of the body in an arc approaching 0; for example, "abduction of the thigh to 110 degrees." The angle measured is that included externally between the member moved and the cephalic part of a line passing through the joint parallel with the median body line.

Adduction is a movement from 180 degrees toward the median body line and the angle measured is that included internally between the member moved and the cephalic part of a line passing through the joint parallel with the median body line. Rotation is measured on the anterior half of a circle whose center coincides with the axis of rotation and whose plane is perpendicular to that axis, with the scale running from 0 on the inner side to 180 degrees on the outer, thus making the internal-anterior angle the angle measured. Measurement is made at the distal end of the bone rotated, such as the femoral condyles in the case of

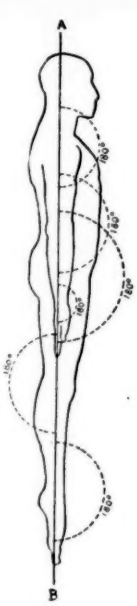

Fig. 1.

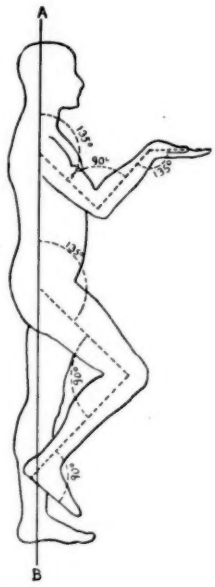

Fig. 2.

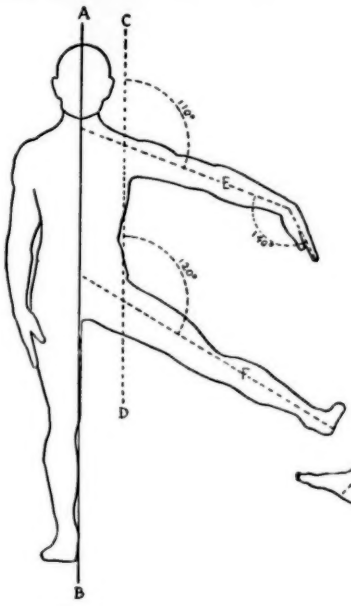

Fig. 3.

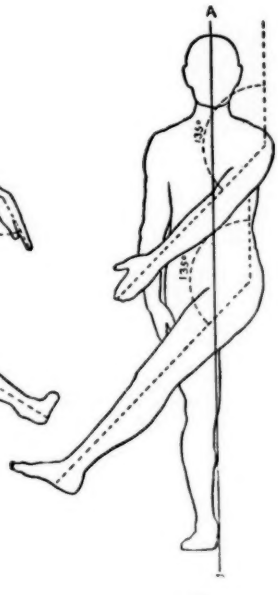

Fig. 4.

Fig. 1. Neutral position, complete extension of all joints.
Fig. 2. Flexion, shoulder to 135 degrees, elbow to 90 degrees, hip to 135 degrees, knee to 90 degrees, ankle (dorsal flexion) to 90 degrees, hyperextension of wrist to 135 degrees.
Fig. 3. Abduction, shoulder to 110 degrees, hip to 120 degrees, flexion of wrist to 140 degrees.
Fig. 4. Adduction, shoulder to 135 degrees, hip to 135 degrees.

the thigh. The radius is an exception because its axis of rotation passes through the lower end of the ulna. Here the indicating line for recording rotation of the forearm is the external projection of the lateral line of the radio-ulnar styloids, complete supination thus registering 180 degrees and complete pronation about 45 degrees.

The article is concluded with tables giving the normal limits of motion in each joint as obtained by active movements. R. G. PACKARD.

SURGERY OF THE SPINAL COLUMN AND CORD

Giannuli, F.: Pseudo-Syringomyelia and Chronic Poliomyelitis (La pseudo-siringomielia e la poliomielite cronica). *Policlin.*, Roma, 1920, xxvii, sez. med., 441.

The author observed the case of a man 64 years old who, at about his thirtieth year of age, had presented a syndrome of symmetrical dystrophy of the limbs resembling progressive muscular atrophy of the Aran-Duchenne type. When seen by the author the syndrome presented was that of muscular atrophy of all the limbs due to an affection of the nerve roots and a manifest degenerative reaction which in the upper limbs involved the shoulder girdle and in the lower limbs was responsible for equinovarus position of the feet. The condition had persisted for forty years. This article is based particularly on the peculiar anatomopathologic findings obtained at autopsy.

The case had been diagnosed as syringomyelia, but this diagnosis was incorrect as the histopathologic characteristics of the disease showed that it was chronic poliomyelitis.

The histologic study of the author's case leads him to the following conclusions:

1. There is a form of very chronic poliomyelitis which is characterized by a mesodermal hypertrophic inflammation, hæmorrhage, extravasation, thrombosis, ischæmic foci usually in the gray matter of the spinal medulla, and secondary atrophic degeneration of the cells and nerve fibers. The ependyma of the central canal is not involved in the inflammatory process.

2. This type of disease occurs between the thirty-seventh and fortieth years of age, and runs a very chronic course which may persist from thirty-five to forty years.

3. The etiology is obscure.

4. On the basis of the empirical character of the autopsy findings and especially the presence of numerous medullary cavities, the condition might be considered a variety of syringomyelia but the histologic character of the anatomical processes shows that it is a variety of chronic poliomyelitis.

5. The clinical syndrome in relation to the site of the anatomical process resembles that of progressive muscular atrophy of the Aran-Duchenne type associated with disturbances in the general sensory system.

6. From the anatomopathologic point of view the presence of cavities in the medulla is of no significance in defining a disease entity; therefore, this of itself cannot define syringomyelia, a disease which has a specific anatomopathologic picture and a specific clinical syndrome.

7. Besides true or gliomatous syringomyelia there are false syringomyelias (hydromyelia, hæmatomyelia, etc.) which have an intimate anatomical and clinical relationship to it. W. A. BRENNAN.

Morgan, I., and Roberts, A. T.: Endothelioma of the Cauda Equina. *Med. J. Australia*, 1920, ii, 533.

The case reported by Morgan and Roberts was that of a laborer, 46 years old, who was admitted to the hospital May 21, 1920, complaining of "lumbago and sciatica," of three years' duration. The pain had been confined to the lumbar regions and thighs on both sides. Three months before the patient's admission to the hospital he noticed that his legs were becoming weak. This weakness increased until he was unable to walk without crutches. He complained also of numbness in the right thigh and left leg and incontinence of urine.

The pupils were found to react to light and accommodation. The cranial nerves appeared to be normal. Sensation, motor power, and the reflexes of the upper extremities and trunk were also normal. There was incontinence of urine and loss of control of the anal sphincter. The skin areas supplied by the fifth lumbar and the first, second, and third sacral nerves on the left side and the first, second, and third sacral nerves on the right side were completely anæsthetic. The knee jerks were absent. There were no plantar or patellar reflexes. No ankle jerks were present. Voluntary movements involving the thigh muscles could be performed easily. There was double foot-drop and complete loss of movement on both sides at the ankle joints and all of the joints of the feet and toes.

The other systems were normal except that well-marked emphysema was present. The urine was alkaline and had a specific gravity of 1.025. A deposit of triple phosphates was noted.

The blood serum failed to fix complement in the Wassermann test.

Lumbar puncture yielded fluid not under pressure containing 25 lymphocytes and 100 leucocytes per cubic millimeter.

A diagnosis of tumor of the cauda equina was made and a surgeon called into consultation.

Two important points were considered in discussing the advisability of operation: (1) the accessibility of the tumor, and (2) the accurate localization of the lesion.

At operation the laminæ of the second, third, fourth, and fifth lumbar vertebræ were removed, exposing the dura. The dura was seen to be pulsating in the upper portion of the cord, but the lower portion lying on the third, fourth, and fifth lumbar vertebræ was firm in consistency and showed constrictions which corresponded to the vertebral arches.

A longitudinal incision 6.25 cm. in length was made in the dura. An adenomatous mass bulged through the incision. By blunt dissection the tumor was shelled from its bed and separated from the constituents of the cord. It extended from the third to the fifth segments and completely filled the spinal canal in this area.

The bleeding at this stage was extremely difficult to control and the escaping cerebrospinal fluid made it impossible to determine the amount of involvement of the nerve roots clearly. The tumor appeared to shell out cleanly from the constituents of the cauda equina.

The incision in the dura mater was closed with a continuous catgut suture and the wound closed with drainage into the upper portion.

The wound healed by first intention. The pathologist reported the tumor to be an endothelioma.

On August 4, 1920, voluntary movements and sensation in both legs and control of the anal and vesical sphincters were returning.

The authors believe that in time, with massage and suitable movements and exercise, function may be restored to the lower limbs.

MARGARET I. MALONEY.

Silfverskioeld, N.: Traumatic Scoliosis (Ueber traumatische Skoliosen). *Arch. f. Orthop.*, 1920, xvii, 563.

Among 891 cases of scoliosis, 32 (3.6 per cent) showed signs of trauma. One-third of these patients were between 14 and 17 years of age. The author does not give the case histories, but shows photographs of a few patients with very marked deformity. He points out that it is impossible to prove a definite relationship between trauma and scoliosis. On the other hand, observations of Kuemmell's deformity indicate that definite changes in the shape of the vertebral column may follow trauma. Traumatic scoliosis resembles Kuemmell's deformity as in both conditions there is a sharp kyphosis and the complaints are similar. On the basis of a study made by Lange of an injury of the vertebral column, the author concludes that trauma may reduce the strength of the bones even when there has been no bone injury. In this way he explains traumatic scoliosis as a "burden-scioliosis."

PORT (Z).

Calvé, J., and Galland, M.: The Treatment of Pott's Disease by Osteosynthesis (De l'ostéosynthèse dans le traitement du mal de Pott). *Rev. de chir.*, Par., 1920, xxxix, 340.

The scope of the authors' article comprises:

1. A review of the pathologic anatomy of Pott's disease and the conditions which precede its development.

2. An attempt to establish the elements of vertebral statics in Pott's disease; to determine the nature of the forces which are applied to a graft implanted in the spinous processes of a tuberculous vertebral column; and to deduce from these facts the value of the operations now performed for the treatment of Pott's disease.

3. A critique of the methods of treatment in actual use and a discussion of other techniques and indications.

Regarding the pathologic anatomy the authors state that the vertebral column has a sustaining or weight-bearing function which is attacked directly by Pott's disease. The principal cause of aggravation of the condition is pressure necrosis. Solid functional and anatomical recovery is obtained by orthopedic treatment only when bony contact is assured. Orthopedic treatment gives excellent results, but these are late. A child may recover entirely, but an adult is always apt to suffer a recurrence.

The evolution of Pott's disease profoundly modifies the vertebral statics from the beginning. The disease divides the spine into two segments acting on each other in a state of unstable equilibrium at the level of the lesion. In this area the superior articular facets rest upon the points of the subjacent articular processes in the same way as the beam of a balance rests on the knife-edge supporting it.

Under classical orthopedic treatment total recovery with minimum of deformity may follow in the case of a child in from three to five years. In the adult under the same treatment a partial recovery of function may be obtained in about two years but relapses are frequent.

The authors' study of the mechanical forces coming into action in Pott's disease shows that the principal force exercised causes elongation. With this is associated an element of scoliosis which is secondary and dependent upon the degree of the displacement of the spinous processes. A rigid graft is able to oppose this elongation only slightly.

In the rigid graft there are three segments to be considered: the segment corresponding to the lesion subjected to a force of elongation and secondary scoliosis; a segment suprajacent to the lesion in which the graft opposes only the normal physiological flexion of the corresponding normal elements; and a segment subjacent to the lesion in which the graft may act as in the suprajacent segment but has not undergone any transformation. These considerations lead the authors to suggest the use of a short graft which is limited in length to the segment recognized as useful and corresponds to the level of the injured vertebræ.

In the authors' opinion it is not probable that osteosynthesis can be substituted for the classical treatment in Pott's disease in the course of development. It does not keep the involved vertebræ from tending toward bony contact and does not prevent pressure necrosis, the principal cause aggravating Pott's disease. This opinion refers to osteosynthesis effected by the Albee or the Hibbs method. In the child a long graft implanted at the beginning of the disease seems useless as it is incapable of counterbalancing the action of the weight of the body and of opposing scoliosis. Moreover it is harmful because it opposes the slow and progressive orthopedic corrections which are effected in the course of the classical treatment. Osteosynthesis in the child is useless after recovery because bone function is re-established in healthy tissue. In the adult osteosynthesis effected by the use of a long graft is an excellent operation complementing the classical treatment.

W. A. Brennan.

SURGERY OF THE NERVOUS SYSTEM

The Diagnosis and Treatment of Peripheral Nerve Injuries. *Report of Committee on Injuries of the Nervous System. Medical Research Council*, Lond., 1920.

Most cases of injury to the peripheral nervous system make a good recovery provided treatment is carried out systematically and continued over a long period of time. An exact knowledge of what nerve or nerves are injured as well as the site of the lesion is essential before treatment is begun, and at the same time an accurate record of motor, sensory, and nutritional changes present should be made.

Stress has been laid on the need for thorough collaboration between the surgeon, masseur, and patient, and on the fact that no operation, however skillfully performed, can ensure success unless the treatment which precedes and follows it is planned carefully and carried out with intelligence.

In testing for motor function care should be exercised to guard against trick movements produced by the use of other muscles to move a joint such as occur in musculospiral paralysis when the patient flexes his fingers at the metacarpophalangeal joint through the action of the lubricals which shorten the long extensor tendons and produce extension at the wrist.

Electrical response alone is not sufficient to reveal the condition of the nerve under examination, but electrical stimulation should form part of the routine examination in all cases of suspected nerve injury. It is of the greatest assistance in testing certain muscles or muscle groups, such for example as the

small muscles of the hand and foot and the muscles of the forearm.

As an immediate preliminary to electrical tests the limb or part to be examined must be warmed and any œdema which is present should be reduced as far as possible by massage. The nerve and muscle are first tested for faradic excitability and, if this is present, no further electrical examination is necessary. Much stress is sometimes laid on polar changes, but these are inconstant and have little or no clinical value. The presence or absence of faradic response is the important factor and in the great majority of cases forms a trustworthy index of the condition of the nerve.

An improvement in the galvanic response may be brought about in the absence of nerve recovery by nutritional treatment. The state of the muscle improves with massage, the application of heat, and galvanic stimulation, but this must not be regarded as evidence of definite recovery.

Warnings are given as to the methods of testing sensibility as misleading information may be obtained if care is not used.

Tests with heat and cold are difficult to carry out in cases of lesions of the peripheral nerves, and contribute little of practical value.

When a nerve is completely divided, that part of the skin which is analgesic becomes inelastic and puckered and does not sweat. It feels colder than the surrounding normal skin and desquamation is retarded so that the surface becomes scaly and loaded with heaped-up epithelium. In the color of the skin there is always a bluish tint which becomes deeper in cold weather or when the part is allowed to hang down. Dependence of the limb leads to swelling. In the analgesic area the tissues are liable to injury, and unless the part is protected, ulcers which are slow to heal readily develop.

When there is complete nerve division vasodilation is a paralytic phenomenon, but when the interruption in conduction is incomplete and the injury is associated with severe and continuous pain, as in causalgia, dilatation of the vessels is due probably to the vasodilators. The nerves with injury of which causalgia is usually associated are the median, sciatic, and ulnar. Sensibility is not abolished, there is little or no paralysis, but the hand or foot may become seriously deformed.

In extreme cases of causalgia the skin is thin, smooth, and glossy. The cutaneous folds disappear and the surface may sweat profusely. When the skin remains dry, the constrictors are probably destroyed. The skin may have the appearance of wash leather owing to the fact that the patient tends to keep his hand continually moist with water to obtain relief from the pain. Sometimes the skin is a bright red or is mottled red and white. It may be tense and firm as if tightly stretched over the wasted tissues. Small vesicles containing clear or blood-stained fluid may be dotted over the surface of the hand and fingers, and chilblains is a common complication.

Characteristic changes occur in the nails. Curved longitudinally and transversely, they grow more rapidly than the nails of normal fingers; they are often thin, striated, and exquisitely tender, and the sensitive nail-beds protrude because of wasting of the finger-pads. The bones become decalcified and brittle and the fingers tapering. Movement of the hands and fingers can scarcely be tolerated, and in consequence it is extremely difficult to combat the development of fibrous changes in the joints and muscles which often leave serious deformities.

In the more chronic cases the appearance of the hand or foot may entirely change. Movement of the hand or fingers can scarcely be tolerated. The ruddy color of the skin may be replaced by pallor, and sweating is no longer observed. The affected muscles become hard and waste rapidly in spite of daily massage, and gangrenous patches may appear within the distribution of the nerve.

The failure to perform a movement may be due to arthritic adhesions or interstitial myositis. The former condition may be due to errors in treatment and especially to prolonged immobilization with splints. It is also of frequent occurrence in association with partial injuries of nerves, the best example being that provided by the median nerve. In cases of median causalgia the metacarpophalangeal joints very rapidly become fixed by adhesions with the result that no movements are possible, even when the pain has subsided and the long flexors of the fingers have recovered their functional activity.

Fibrotic changes in muscles may be due to prolonged sepsis or to interference with their vascular supply. The latter (ischæmic paralysis) may be brought about by faulty splinting or destruction of the main arterial supply of the limbs.

The treatment of cases of peripheral nerve injury during a period of observation and after operation follows similar lines. It may be considered under two headings: (1) postural treatment, (2) nutritional treatment.

The principle of treatment by posture is to relax the paralyzed muscles and thus prevent their being stretched either by the force of gravity or the pull of the non-paralyzed opponents.

It is scarcely necessary to say that splints must not be employed indefinitely. When no further recovery can be expected they should be discarded.

The treatment necessary to maintain and improve the nutrition in the paralyzed part comprises heat, massage, electrical stimulation, exercises, and re-education.

Massage should be carried out once daily for from fifteen to twenty minutes and must be sufficiently vigorous to cause pain. It is the best physical method of reducing œdema.

Electricity is of value only as a stimulus to provoke contractions in the paralyzed muscles. The weakest effective current, galvanic or faradic, should be employed.

Re-education is perhaps the most important part of the treatment. It is essential to interest the

patient in his recovery, and as regeneration advances to teach him to reproduce voluntarily those movements which have been produced by electrical stimulation. Specialized re-education becomes particularly necessary when we are dealing with the intrinsic muscles of the hand.

With few exceptions operations upon injured nerves must necessarily be of an exploratory nature. The site of the lesion and the presence or absence of conductivity in the nerve may be determined by clinical observations. In many cases the condition revealed when the nerve is exposed can be foretold with some accuracy, but it is only by inspecting, handling, and directly stimulating the nerve that its state can be ascertained with precision.

Operation is generally indicated under the following circumstances:

1. Total loss of conductivity, sensory and motor, in the area exclusively supplied by a nerve which persists after an interval of two months during which proper treatment has been carried out. This interval is an arbitrary period; it allows time for the first appearance of signs of recovery provided the lesion does not require a lengthy process of regeneration.

2. Palpable neuromata at the site of the injury of a nerve whose function is seriously disturbed.

3. When recovery has begun but has not progressed according to the usual rate or has ceased. Still more, when function has relapsed.

4. Persistent, severe, intractable pain.

The contra-indications are:

1. The presence of an unhealed wound. This should be regarded as an absolute bar to successful operation upon an injured nerve. When the wound has been healed for a few weeks only, especially if bone was damaged at the time of the injury, the operation should be delayed on account of the danger of recrudescent sepsis.

2. Progressive recovery.

3. An injury so placed as to render an operation unusually difficult or the likelihood of successful suture very doubtful.

The cutaneous incision must be so planned as either to deal radically with or to avoid the scar of the original wound, while at the same time it should provide free access to the damaged nerve for a considerable distance both above and below the site of injury. The operation must be conducted as far as possible in a bloodless field.

No attempt to examine the site of injury should be made until the nerve has been exposed both above and below that point. Before the damaged point is disturbed, the trunk above should be freed, insulated by passing a broad strip of India-rubber beneath it, and stimulated with an extremely weak faradic current, the effects being noted and recorded.

There has been considerable discussion as to whether the whole or only a part of the proximal bulb should be resected. It is probably of more importance to have the sectional area of the two surfaces which are to be sutured together as nearly as possible of the same size and individual nerve bundles distinctly visible. The various special manœuvres for bringing together widely separated ends which may be adopted are:

1. Loosening of the nerve in its bed for some distance, both above and below, by passing a blunt dissector along it.

2. Relaxation of the nerve by flexing or extending the joints over which it passes.

3. Displacement of the nerve so as to make it pursue a more direct course.

Whatever material is used for suturing it should be as fine as is consistent with efficiency and a material which excites the minimum amount of fibroblastic reaction around it. Fine linen thread and silk make satisfactory suture materials. Catgut as ordinarily prepared causes much more cellular reaction than either linen thread or silk, and it is doubtful whether this disadvantage is overbalanced by its greater absorbability. The passing of a central retention stitch through the thickness of the nerve is undesirable and rarely necessary. A proper approximation can be secured by suturing the edges of the sheath only. A continuous suture should never be used. The two surfaces should not be brought tightly together; regeneration takes place more easily when they are separated by a minute space.

After suture the nerve should be left lying in contact with normal cellular tissue or muscle if possible. No advantage has been shown to attend the wrapping of the nerve in artificial membranes, fat, or fascia, and subsequent explorations have not infrequently shown that in some cases these materials exert a harmful influence. The wound must be rendered as dry as possible before it is closed. The importance of careful hæmostasis can scarcely be overrated.

When it is impossible to obtain approximation of the ends of a divided nerve, the outlook is extremely unfavorable for there is at present no known method which can take its place. It is therefore of the utmost importance that every possible manœuvre should be tried and every means for securing end-to-end approximation exhausted before resort is had to grafting. Lateral implantations and flap operations are mentioned here only to be condemned. In what is at present known regarding the processes of regeneration of nerves there is nothing to justify these procedures and no unimpeachable evidence that they have been successful. Return of function after nerve suture depends, in the first place, on the re-establishment of structural continuity between the fibers of the proximal end of the nerve and the peripheral structures.

Neurofibrils appear to grow at a fairly constant rate so that the length of time required for regeneration of a given fiber varies directly with the distance it has to travel. The shorter the course the sooner will the connection be established. It follows, therefore, that in general recovery can be expected earliest in short nerves, in cases in which the lesion

is distal, and in muscles in which the motor points lie nearest the site of suture.

The care with which the paralyzed parts are attended to during the period of waiting, before and after the operation, has a profound influence on the time necessary for the return of function after suture as well as on the completeness of the ultimate recovery. The results will inevitably be disastrous, however perfect the regeneration of the nerve may be, if the affected muscles are allowed to become wasted and stretched and the skin to remain poorly nourished because of neglect of appropriate nutritional and postural treatment.

The degree of specialization of function in different nerves and in separate muscles supplied by the same nerve has a decided bearing on recovery. The median nerve requires a longer time than the musculospiral nerve and the intrinsic muscles of the hand than those of the forearm, and recovery on the whole is less perfect.

The interval between the receipt of the wound and the operation has no influence on the time taken for recovery for as good functional results have been obtained from suture performed two or three years after the date of injury as from primary suture.

After the reunion of the ends of a mixed nerve the first evidence that function is returning is usually volunteered by the patient. He becomes aware that some change is taking place in the distribution of the nerve. The first alteration in sensation to be detected is an appreciation of pressure. The area of loss of deep sensibility then gradually diminishes. About the time that sensibility to pin-pricks returns the skin loses its cyanosis and begins to appear more normal.

This report takes up in detail the symptoms and diagnosis of injuries of the special peripheral nerves, very accurate localization methods, and the pathology and operative treatment of special lesions.

H. A. McKnight.

Berblinger, W.: Gunshot Paralysis of Peripheral Nerves and Their Operative Treatment from the Viewpoint of Anatomy (Die Schusslaehmungen der peripheren Nerven und ihre operative Behandlung vom anatomischen Standpunkt aus betrachtet). *Fortschr. d. Med.*, 1920, xxxvii, 209.

Histologic studies of gunshot injuries of nerves have shown that in the central segment progressive degenerating processes greatly delay or prevent the return of function whereas in the peripheral segment a structure persists which is not unfavorable to operative repair even years later. In addition to total and partial gunshot injuries there are also distant injuries of peripheral nerves (Perthes) and injuries due to burning by the bullet or missile.

The traumatic degeneration consists in gradual death of the torn axis cylinder with granular degeneration of the nerve fibrils. Later degeneration of the medullary sheath and Schwann's sheath occurs. The cells of the latter proliferate, show nuclear proliferation, and absorb the rests of the degenerated myelin of the medullary sheath. This process extends for a variable distance up the central segment and, being repeated in the peripheral segment, gradually involves the entire periphery. In the zone of directly traumatized areas this process goes on more slowly and traumatic and secondary degeneration may be distinguished.

Proliferation of Schwann's cells leads to the formation of cell bands in the peripheral segment as well as in the distal end of the central stump. These are important for regeneration. From three to four months after the injury the cell bands take on a parallel course similar to that of a nerve bundle and become differentiated into an inner zone with fibrillary striping and an outer zone. This process is the preliminary step in regeneration which, according to Berblinger, may originate not only in the axis cylinder as a whole but also in any one of the fibrils making up the axis cylinder.

The development of the Schwann cell bands precedes the fibrillary process, i.e., the formation of the new axis cylinder, and recedes as the latter advances. According to Edinger, agar-filled calf arteries used to bridge the defect gave rise to a foreign-body inflammation and hindered the formation of the cell bands. Therefore the result was a failure.

In closing the portion of his article dealing with the histologic aspect of injuries of peripheral nerves the author states that the proliferated Schwann cells are not only the pathfinders for the newly formed nerve fibers but also the paths for their nutrition and, in spite of the regenerating influence of the ganglion cells, are of the greatest importance in the formation of the neurofibril complexes.

Scar excisions and operative re-union of the cut ends are occasionally done unnecessarily as many newly formed nerve fibers pass through the scar and the results of neurolysis are to be explained only by the assumption that conditions are made more favorable for the development of cell bands and fibrillization. However, as the number of spontaneous improvements following nerve injury due to gunshot wounds is small, scar resection with re-union of the ends remains the method of choice. Surrounding the nerve suture according to Borchardt's method with a sheath of fat or muscle seems efficacious.

The advisability of doing a double implantation according to von Hormeister's method is open to serious doubt as there is danger of partial paralysis of the bridging nerve. Bethes' method of bridging the defect with a section of nerve deserves consideration. While necrosis of the implanted nerve prevents the formation of cell bands, the endoneural connective tissue persists longer and unites with the endoneural connective tissue of both stumps. Theoretically at least, similar changes are possible in the formation of a flap from the peripheral nerve segment. In endoneural neurolysis according to Stoffel's method the anastomosis between the fibers of a nerve bundle may be injured. Heinecke's method of implanting the central segment into the

muscle promises good results. If no improvement is noted after three or four months operation by Perthes' method should be considered. PLENZ (Z).

Stopford, J. S. B.: The Treatment of Large Defects in Peripheral Nerve Injuries. *Lancet*, 1920, cxcix, 1296.

The author presents his conclusions which are derived from investigations carried on to test the advantages and disadvantages of various operations designed to bridge gaps in peripheral nerve injuries.

A plastic operation on the nerve was done in 3 cases. A flap from the proximal or distal end or both ends was used. As no clinical evidence of regeneration was found at the end of three years, there is no physiological justification for such a procedure.

Incomplete nerve-crossing was done in 7 cases. This consists in lateral implantation of the distal segment or of both the proximal and distal segments of the injured nerve into a neighboring intact nerve trunk. In each instance the ulnar nerve had been implanted into the median. No patient showed evidence of ulnar regeneration, while all showed definite interference in conduction in the distribution of the median nerve. Physiologically and clinically there is no reason to retain such an operation.

The author records 12 cases in which a bridging operation by autogenous or heterogenous nerve-grafts, a fascial sheath, or a vein was performed. His colleague, Platt, has reported 18 others, making a total of 30. In none was there any evidence of motor or sensory recovery at the end of two years.

Displacing a nerve from its course so that the ends may be brought together allows the performance of end-to-end suture in certain cases. Twenty-nine cases in which an ulnar nerve had been displaced to the anterior aspect of the inner humeral condyle were observed. There was no instance of complete failure. In simple end-to-end suture without displacement the proportion of failures has been as high as 30 per cent.

The operation is done in two stages. The first stage consists of drawing together the two ends of the nerve by through-and-through sutures with the limb so fixed that maximum relaxation is maintained. Re-exploration with freshening of the ends and accurate end-to-end suture comprise the second stage. This is not undertaken until sufficient stretching and relaxation have occurred. A. C. JOHNSON.

MISCELLANEOUS

CLINICAL ENTITIES — GENERAL PHYSIOLOGICAL CONDITIONS

Moore, J. T.: Blastomycosis; with Report of a Case Dying from Abscess of the Brain. *Surg., Gynec. & Obst.*, 1920, xxxi, 590.

The organism causing blastomycosis was first described by Gilchrist of the Johns Hopkins Hospital in 1894. At first it was believed that the disease involved only the skin; hence the name "blastomycetic dermatitis." It is now known that it may involve any or all of the organs of the body and may begin either with constitutional or local symptoms.

The source of the condition is still an unsolved problem. The lungs, intestines, skin, tongue, and gums have been thought to be avenues of infection.

The case reported was that of an athletic school boy, 17 years of age, who had no bad habits except that he often held a splinter or stick of some sort in his mouth. His family history also was negative. The condition began with pain in the left lower jaw. A dentist pulled the wisdom tooth but pain and swelling in the face and the side of the head continued. Two months after the condition began, an area above the left ear was drained but only bloody serum was evacuated. As the pain continued the patient consulted a specialist on the ear, nose, and throat three and one-half months after the condition began. The X-ray and other studies showed no mastoid trouble and no involvement of the eye, ear, nose, or throat. The author took charge of the case three months and three weeks after the beginning of the infection. Examination showed the blasto mycosis organisms in several areas over the face.

The treatment consisted of thorough curettage, swabbing with strong iodine, packing for twenty-four hours with iodoform gauze, irrigation with Dakin's solution for four days after the removal of the gauze, and the administration of potassium iodide in increasing dosage up to 240 gr. per day.

One week later another curettage was done and after a few days X-ray treatment was given. In sixty days the wounds had healed except for small superficial areas. The latter were opened up daily and syringed with 1 per cent copper sulphate solution. The patient left the hospital apparently cured. Six months later, however, the tissues in the orbit of the left eye showed evidence of involvement. The abscesses were opened and syringed out with 1 per cent copper sulphate but the eyeball gradually bulged forward. Enucleation was done after the sight had been lost as the result of optic atrophy. A large abscess mass the size of the eye, which was situated deep in the orbit on the temporal side, was evacuated.

Four days later a swelling appeared over the left frontal eminence. From this a large amount of pus was evacuated apparently from beneath the skull. The next day the patient had a convulsion. In all, there were 18 of these attacks. Paralysis of the right arm and partial paralysis of the right side of the face then developed. Death followed.

The Wassermann test was found negative twice and the urine showed nothing abnormal. Blood cultures were also negative. Pus from the face

abscesses showed both large and small blastomycosis organisms; that from the abscess in the orbit, large organisms; and that from the brain abscess, only small organisms.

At autopsy four abscesses with three openings through the skull were found in the left anterior half of the brain. The largest brain abscess measured 3.4 by 2.5 cm.

The author concluded that the infection was probably introduced by the splinters held in the mouth and that the treatment was not sufficiently radical to destroy the various foci of the disease. The eye should have been sacrificed sooner and radium should have been used in the orbit. The X-ray was probably the best agent for the treatment of the lesions of the face and neck. The disease remained more or less local for some time.

SERA, VACCINES, AND FERMENTS

Kraus, E., and Sordelli, A.: Experiments upon the Preventive and Curative Power of Normal Serum in Experimental Diphtheritic Infection and Intoxication (Experimentos sobre el poder preventivo y curativo del suero normal en la infección e intoxicación difterica experimentales). *Rev. Asoc. méd. argent.*, 1920, xxxiii, soc. biol., 365.

Bingel has recently reported a series of 471 cases of diphtheria in which the antitoxin was withheld entirely, injections of normal horse serum being given instead. The mortality in this series was 6 per cent. In a series of 466 cases treated by the usual injections of diphtheria antitoxin the mortality was 5.4 per cent. On the basis of these results Bingel ascribes a curative value to normal horse serum and questions the specific immunizing reaction of diphtheria antitoxin.

Kraus and Sordelli have investigated this subject and have been able to show that normal horse serum may contain diphtheria antitoxin in varying amounts which can be determined by actual titration according to the methods of Ehrlich and Roemer. In colts the quantity is small, while in older horses it is greater.

The preventive and curative power of normal horse and beef sera was then determined by experiments on young rabbits weighing between 600 and 900 gm. It was found that the preventive power depended exclusively upon the content of antitoxin, the quantity of serum having no influence. Thus the smallest preventive dose for a fixed quantity of diphtheria organisms injected into the animals was 0.5 c.cm. of horse serum and 10 c.cm. of beef serum, each of these volumes containing a half unit of antitoxin. However, 10 c.cm. of colt's serum was not preventive, the antitoxin content in this case being only 0.2 of a unit. On comparing the preventive power of the normal sera with that of standard antitoxin, the preventive dose was found to be 0.5 of a unit.

The comparative curative value was tested in much the same way, young rabbits being infected two hours previously by an intravenous injection of a fatal dose. It was found that normal sera have a curative power in direct proportion to their content of antitoxin. By separating the proteins of the normal sera it was found further that the diphtheria antitoxin was contained in the pseudoglobulins just as in the preparation of diphtheria antitoxin from immune sera. W. R. MEEKER.

BLOOD AND LYMPH VESSELS

Mantelli, C.: The Indications and Results of Saphenofemoral Anastomosis (Dell' anastomosi safeno-femorale; indicazioni ed esiti). *Clin. chir.*, 1920, n. s. ii, 666.

This article is based on 9 cases operated upon for varix. Mantelli describes the theoretical basis of the Delbet method of saphenofemoral anastomosis in the treatment of varicosis of the internal saphenous vein and discusses the indications, technique, and immediate and end-results.

The indications for saphenofemoral anastomosis are: (1) a good general condition; (2) varicosis of the internal saphenous vein; (3) the Trendelenburg sign; (4) newly formed varicose veins in which the elasticity and contractability of the vessel walls have been preserved at least partially; (5) patency of the saphenous vein and the absence of inflammation.

In the author's 9 cases the following results were obtained: anatomical and functional recoveries, 1; functional but only partial anatomical recoveries, 3; functional recoveries only, 2; doubtful results, 1; and poor results, 2.

The results were poor in one case because there was associated varicosis of the external saphenous vein. This failure is therefore attributable not to the method, but to inexact appreciation of the indications. The second failure was caused by the development of varicosis of deep veins a few months after operation in the case of a patient who had had phlebitis secondary to typhus fever.

On the whole the results were good but the author raises the question whether this operation, which demands delicate execution, is justified on physiopathologic grounds. In his opinion it is the method of choice only in cases of varicosis of the internal saphenous and its branches. In none of Mantelli's cases was it performed more than seven years ago. In other types of cases total saphenectomy is indicated. W. A. BRENNAN.

Razzaboni, G.: Primary Sarcoma of the Thrombosed Internal Saphenous Vein (Sarcoma primitive della vena safena interna trombizzata). *Arch. ital. di chir.*, 1920, ii, 483.

The author removed a tumor from the inguinocrural region in a man aged 62 years. This growth was the size of an orange and had an irregularly bosselated surface except in the deep portion corresponding to the fascia lata where it was smooth. Its color was a whitish gray with brown spots. On section the growth was found to be traversed with

numerous small blood vessels and covered with a capsule continuous with the sheath of the saphenous vein. Throughout the resected tract this vein was completely transformed into a very hard tortuous cord of uniform rose-gray color. On section the vascular walls could not be distinguished.

The anatomopathologic findings showed that the trunk of the saphenous vein was the point of origin of the tumor. This was demonstrated by the intimate fusion between the neoplastic and vascular tissues and by the capsule of the tumor which showed the structure of the vascular wall. The author concluded that the growth was primary in the thrombosed left internal saphenous vein of the thigh.

Histologically the tumor was sarcomatous and showed traces of melanotic pigmentation. There were no demonstrable metastases in the corresponding lymph glands. While the growth contained a few giant cells, its principal characteristics were those of a polymorphous-celled sarcoma. In limited zones, however, true perivascular cellular masses were demonstrated and clearly differentiated from the rest of the sarcomatous tissue. The fact that these were in intimate relation to the vascular wall on which they seemed to depend suggested that the tumor was of endothelial origin.

In the author's opinion the tumor may have developed in either of two ways: (1) a sarcomatous metaplasia of the connective tissue may have occurred in the thrombosed mass and a perithelial development around some of the blood vessels in the connective tissue mass; or (2) the frankly sarcomatous structure may have become predominant in a perithelioma.

The general symptoms were those common to many lesions of the saphenous vein but Razzaboni believes that if the anatomoclinical findings are carefully studied an exact diagnosis is possible.

W. A. BRENNAN.

Valentine, H. S.: Traumatic Aneurisms. *J. Missouri State M. Ass.*, 1920, xvii, 475.

A traumatic aneurism is a false aneurism resulting from a slight injury to a blood vessel. Severe injuries, such as complete division of a blood vessel, seldom result in aneurism. When the injury damages both the artery and its companion vein, an arteriovenous aneurism results. When there is a direct connection between the two vessels an aneurismal varix is formed. When a sac intervenes between the vessels the condition is termed a "varicose aneurism."

The size of the aneurism varies with the time which has elapsed since the injury, its location, and the size of the blood vessel. Of 50 aneurisms, Eccles found that 7 occurred in the head and neck, 14 in the upper limb, and 29 in the lower limb. The popliteal artery was involved in 13 cases, the superficial femoral in 8, and the posterior tibial, the axillary, and the brachial artery in 5 each. The mortality was 8 per cent.

The clinical symptoms of traumatic aneurism are many. The cardinal sign is a pulsating tumor which tends to expand in all directions synchronously with the heart beat and is quieted by pressure over the main vessel. A systolic bruit or a murmur may be heard directly over the aneurism. It is well to remember that at times these murmurs may be transmitted to the heart. A thrill is occasionally felt during systole and Makins has noted a fall in the blood pressure in the affected limb. Pressure symptoms such as œdema, erosions, gangrene, and nerve lesions are to be looked for in the majority of cases. Septic and ascending thrombi are common complications of traumatic aneurism.

Early operation is advisable if there is no infection, if the vessels are still nearly normal, if the X-ray shows absence of foreign bodies in the limb, and if the collateral circulation is sufficient to nourish the extremity. This last condition is best determined by the method of Matas. Complete ischæmia of the limb below the aneurism is obtained by the application of an Esmarch elastic bandage. Pressure on the main vessel is now made to quiet the aneurism completely. The Esmarch bandage is kept in position for five or ten minutes; it is then removed while pressure on the main vessel is still maintained. If the circulation is well established a hyperæmic blush immediately returns.

The classical operation for aneurism has been ligation of the vessels. This has been done in various ways. Grégoire believes that in the treatment of arteriovenous aneurism vessel suture should be attempted more often. Chevrier has reported 6 cases of arteriovenous aneurism successfully treated by extirpation after quadruple ligation. Herrick has proved that fascial inserts can be made without causing clotting of blood in the vessel. He concludes that such an operation can be used to reduce the orifice in sacciform aneurism. Tuffier has successfully treated an aortic aneurism by wrapping strips of fascia lata around the vessel in two layers and producing sufficient tension to narrow the aorta. Macewen has introduced long-pointed tempered-steel pins with which he scrapes the intima, thus producing a blood clot.

The reconstructive operation of Matas for the cure of saccular aneurism is being used more frequently. It is supplanting the old classical operation of ligation. This method is safe, does little damage to the circulation, and gives immediate relief from pressure symptoms. The main vessel is controlled by an Esmarch bandage, a tourniquet, or direct pressure until the aneurism is quieted. The sac is then exposed by a free incision parallel with the long axis of the sac. The sac is opened and explored and the type of aneurism determined. In sacciform aneurism (the common type) a single orifice is found. The purpose here is not only to obliterate the opening between the sac and vessel but also to restore the continuity of the vessel wall. The best type of needle is a small round needle. This should be threaded with vaselined silk. The sac is obliter-

ated by running sutures, care being taken that the needle does not enter the artery and the size of the vessel is not changed after the sutures are tightened. The circulation of the sac must not be interfered with and no dead spaces should be left. A sterile gauze dressing is applied and the entire limb is wrapped in cotton-batting and immobilized with splints. LOUIS HANDELMAN.

SURGICAL DIAGNOSIS, PATHOLOGY, AND THERAPEUTICS

Widal, F., Abrami, P., and Iancovesco, N.: The Test of Digestive Haemoclasis in the Study of Hepatic Insufficiency (L'épreuve de l'hémoclasie digestive dans l'étude de l'insuffisance hépatique). *Presse méd.*, Par., 1920, xxviii, 893.

The authors give experimental and clinical details regarding a new method of determining functional insufficiency of the liver, viz., the test of digestive hæmoclasis. This test consists in seeking a hæmoclastic crisis after the fasting patient has absorbed a glass of milk. In its simplest form it consists of repeated countings of the leucocytes.

The method described is based on two physiological facts which the authors determined in a series of experiments on dogs: (1) in the normal state during the digestion of an albuminous meal, protein substances which are incompletely disintegrated penetrate the intestinal mucosa and enter the portal vein; (2) the liver opposes the penetration of certain of these substances into the general circulation where, because of their heterogeneity, they unfailingly provoke the appearance of a distinct hæmoclastic crisis.

The authors state that the arresting function of the liver in this connection, which they term the "proteopexic function," has been ignored. The production of the crisis indicates inadequate elaboration of the nitrogenous substances of digestion. It would be produced constantly in the course of digestion if the liver did not protect the organism by arresting the injurious substances.

The proteopexic function is analogous to that which the liver exercises with regard to a great number of toxins coming from the intestine and its importance can be measured by the gravity of the disturbance produced by the direct penetration of non-disintegrated albumins into the general circulation.

The authors' research shows that in the diseased liver the proteopexic power is deficient. The consequent extrance of incompletely disintegrated proteins into the general circulation is immediately translated by a hæmoclastic crisis. In normal subjects the ingestion of nitrogenous food is not followed by a hæmoclastic reaction; instead of leucopenia there is more frequently a hyperleucocytosis, the arterial pressure tends to rise, and the refractive index of the serum is increased. The same is true also in pathologic conditions in which the liver is unchanged.

In making the test the authors have tried numerous albuminous substances but have concluded that milk is the best. Two hundred grams of milk greatly exceed the quantity necessary to provoke hæmoclasis in a case of diseased liver. The patient should fast for at least five hours before the test meal is given. This is most important as the absorption of even a minimum quantity of nitrogenous substance during this time falsifies the results of the test. In the authors' experiments the blood was tested every twenty minutes for three hours after the ingestion of the milk and the leucocyte content, arterial pressure, coagulability, and serum refraction index of the blood were noted to discover the occurrence of a hæmoclastic crisis. The results are obtained within one hour and the crisis is in its apogee at about the end of the first forty minutes. The clearest finding is leucopænia.

The test meal produces immunity for about three hours and the ingestion of a second meal during this time will usually not give positive results.

The authors have determined the value of the test clinically in cases of manifest hepatic lesions, such as those causing icterus, cancer of the liver, cirrhosis, etc. They have used it altogether in 39 cases. In all of these, except 1, the results have been remarkably clear. The blood cells decreased progressively to three-fourths, one-half, and even one-third of their original number, the arterial pressure decreased 1 to 2 cm. or even more, the blood became more rapidly coagulable, and the serum refraction index fell. After about an hour and a half these figures were reversed, a phase of leucocytosis with slight hypertension succeeding the hæmoclastic crisis. Early appearance, rapid evolution, and especially marked diminution in the leucocytosis and the arterial pressure were the characteristics of the hæmoclastic crisis in the cases of liver affections subjected to the test. The case which was an exception to the general rule was a case of pigmentary cirrhosis in a malarial diabetic. In this type of cirrhosis a sufficient number of normal hepatic cells survive to maintain the proteopexic function of the organ.

The clear results obtained by the test of digestive hæmoclasis in evident cases of liver disease have prompted the authors to make the same research in cases in which hepatic pathology is suggested by only very slight urological symptoms and those in which it is merely suspected, the symptoms being entirely absent. They give the details of this study in a number of such cases, including alcoholism, diabetes, etc. They have been convinced of the extreme sensitiveness of the test as it clinically revealed latent hepatic lesions which would otherwise have passed unperceived.

Particular attention is given to the study of the effects of arsenobenzol injections and anæsthetics. Chloroform administered in weak dosage and during a very short time very rapidly injures the proteopexic function of the liver, the effect appearing usually the day following the induction of the anæsthesia. The effects of ether are not so constant.

In cases of appendicitis the results of the test established the presence of latent disease of the liver due to a focus in the appendix. The menace to the liver usually disappears within a few weeks after the removal of the appendix. Diabetics showed the hæmoclastic crisis after the ingestion of a small quantity of sugar. W. A. BRENNAN.

Bazán, F.: Accidents from Lumbar Puncture in Hydrocephalus Due to Tuberculoma of the Cerebellum (Accidentes por punción lumbar en la hidrocefalia tuberculoma del cerebelo). *Semana méd.*, 1920, xxvii, 797.

Bazán reports two cases of hydrocephalus in infants in which death resulted from lumbar puncture. The first was a case of congenital hydrocephalus in an infant 8 months of age. Lumbar puncture with the removal of 5 c.cm. of fluid produced no untoward effects. A second puncture two months later with the withdrawal of 40 c.cm. of fluid was followed by symptoms thought to be due to cerebral congestion. These consisted of fever of 100 to 101 degrees, paralysis of one arm, generalized rigidity, a Kernig sign, and trismus. Gradually coma supervened, growing continuously deeper until death occurred five days after the puncture. No autopsy was performed so that the underlying pathology remained unknown.

Death followed the second lumbar puncture also in the other case. The patient was 17 months of age and the hydrocephalus was very pronounced. Death resulted twenty-four hours after ventricular puncture with the removal of 10 c.cm. of fluid. A somnolent state with a mild temperature developed at once and was followed by coma. At autopsy marked caseous degeneration of the mesenteric lymph glands and a tuberculoma of the cerebellum occupying the central portion and almost half of both lateral lobes were found.

The cause of death from puncture in hydrocephalus has been variously explained as due to too sudden decompression, hæmorrhage ex-vacuo, and intercurrent infection. The probable presence of a brain tumor is not regarded as a contra-indication to lumbar puncture, but in such cases the needle used should be very fine, only a small quantity of fluid should be withdrawn, and an equal amount of serum should be injected. W. R. MEEKER.

EXPERIMENTAL SURGERY AND SURGICAL ANATOMY

Camus, J., and Roussy, G.: Experimental Research on the Pituitary Body. *Endocrinology*, 1920, iv, 507.

The authors consider in succession the relation of polyuria to the removal of the pituitary body, the relation of polyuria to lesions of the base of the brain, the site of the lesions which lead to polyuria, the interrelation of polyuria and polydipsia, and the regulation of water retention in the body.

In a very great number of cases hypophysectomy, partial or total, practised on the dog by the buccal-transpalato-sphenoidal route marked polyuria was noted. In the cases of the first 2 animals operated upon the urine was not measured accurately as receptacles of a capacity of only 1 or 2 liters were placed under the cages and during the night these overflowed.

At first, in the belief that the pituitary body alone was involved, the authors measured the relative importance of the different parts of the organ in the production of the phenomenon. They were very rapidly brought to the realization, however, that the key to the phenomenon was not to be found in an attenuation of the hypophyseal function. Contrary to the generally accepted view, these ablations—whether total or limited to one lobe—did not influence diuresis. Two examples, chosen from among others, are given to bring out this point. In 2 dogs complete removal of the hypophysis resulted in a notable polyuria in 1 while in the other there was not a trace of polyuria. The autopsies showed that in the first case the base of the brain had been somewhat injured during the hypophysectomy, while in the second the brain was intact.

To determine the rôle played by lesions in the part of the base of the brain which borders on the pituitary body, the authors injured this region with a heated needle without injuring the hypophysis itself. To do this they perforated the sphenoid with a gimlet. In the five cases in which this operation was performed a very marked polyuria resulted despite the absence of any change in the pituitary body as shown at autopsy.

During certain experimental investigations on the pituitary body the authors observed trophic troubles of the genital organs. From their experience gained from 5 dogs they concluded that in the incidence of atrophy of the genital organs they were dealing rather less with a hypophyseal lesion than with trouble at some point in the base of the brain, the exact site of which could not be determined without more precise methods.

Their experimental research on hypophyseal glycosuria was of two types, that dealing with a spontaneous glycosuria consecutive to an operation on the pituitary body, and that dealing with the tolerance for carbohydrates of the animals operated upon. Forty-five dogs and 9 cats were used in these investigations. In the 45 dogs glycosuria was observed only 6 times. That is, in 39 cases the result was negative so far as the presence of sugar in the urine was concerned. In 30 of the animals lesions of the base of the brain were not produced. In 14 the removal was complete while in the 15 others it was partial. In all these cases no glycosuria was observed after operation. Of the 6 dogs showing positive results at least 4 showed lesions of the base of the brain.

To determine the tolerance to carbohydrates on the part of animals deprived of the pituitary body—alimentary glycosuria—glucose was given through

an œsophageal tube to dogs which had been totally or partially deprived of the pituitary body. The different interventions practiced on the pituitary body—partial removal of one or both lobes or total removal—modified in appreciable fashion neither the tolerance to carbohydrates nor the appearance of alimentary glycosuria.

Injections of concentrated extracts of the posterior lobe, the anterior lobe, or the whole hypophysis did not sensibly modify the limit of tolerance to carbohydrates in the animals operated on.

G. E. BEILBY.

Crile, G. W.: The Relation of the Thyroid and of the Adrenals to the Electrical Conductivity of Other Tissues. *Endocrinology*, 1920, iv, 523.

Crile mentions Osterhaut's demonstration that iodine increases the electrical conductivity of living vegetable tissue. In an investigation undertaken in his laboratory he found that the electrical conductivity of the brain, the liver, the spinal fluid, the heart, and the lungs is increased in iodism produced by the injection of iodoform into the peritoneal cavity. A limited number of observations indicated that an increase in the conductivity of the brain and liver is an early effect of thyroid feeding. In exhaustion produced by thyroid feeding for prolonged periods the conductivity of the brain is decreased as in exhaustion due to other causes.

The relation of the increased electrical conductivity produced by iodine to the function of the thyroid gland became apparent with the realization that, as far as was known, the only function of the thyroid gland is to metabolize, to store, and to deliver iodine, and that the excessive administration of iodine produces symptoms identical with those produced by abnormal amounts of thyreoiodine manufactured by the thyroid gland. A limited number of observations indicated that excessive iodine and excessive thyroid activity alike produce increased sensitivity to adrenalin, increased metabolism, increased respiration, tachycardia, elevation of the temperature, and ultimately emaciation, delirium, and death.

As the normal activities of life in the case of the normal individual are made possible by the amounts of iodine received from the thyroid, and as abnormal amounts of iodine increase the activity of the organism as a whole, this increase was interpreted in the light of the author's experiments as due, in part if not wholly, to the effect of iodine upon the electrical conductivity. Persons with exophthalmic goiter tolerate iodine poorly. If too much iodine or thyroid extract is given to a patient with simple goiter, exophthalmic goiter is induced. Such cases are identical with exophthalmic goiter induced by any other cause. On the other hand, if the thyroid gland does not metabolize sufficient iodine to meet the need of the organism there results a condition of subnormal metabolism in which the individual is dull, stupid, and more or less in a state of torpor.

Iodine increases the electrical conductivity of living tissue; increased electrical conductivity is probably synonymous with increased permeability; increased permeability increases function.

Through the mediation of the nervous system a reciprocal interaction is established between the thyroid, the adrenals, and the nervous system. Iodine alone, adrenalin alone, thyroid extract alone, emotion, exertion, or infection alone each causes a "kinetic drive" with phenomena similar to those of exophthalmic goiter.

If this interpretation is correct, the drive of exophthalmic goiter is diminished by lessening the activity of any of the three interacting organs—of the brain, by rest cure; of the thyroid, by resection; of the adrenals, by partial removal. Although evidence of the positive value of the last-named procedure is incomplete, nothing in surgery has been more striking than the immediate benefit derived from the surgical treatment of exophthalmic goiter.

G. E. BEILBY.

Asami, G., and Dock, W.: Experimental Studies on Heteroplastic Bone Formation. *J. Exper. M.*, 1920, xxxii, 745.

The occurrence of bone in abnormal locations has been frequently reported in the literature and its experimental production in various species of animals has been recorded by a number of workers. Recently a case of bone formation in the fallopian tube was described and the possible mode of its origin was discussed on the basis of a review of the literature and clinical and histological study. Most of the experimental work done has dealt with such problems as the origin of the blood cells and the restoration of renal function, and for this reason reliable and convincing data on the mode of origin and growth of aberrant bone were not then available. Although almost all investigators agreed that such bone arose from fixed tissue cells by a process of metaplasia, there was much difference of opinion as to the factors initiating the process and as to whether the proliferating cells became osteoblasts or merely a hyaline connective tissue which later was directly converted into osseous tissue.

Numerous observations of human pathologic specimens and animal experiments have been published, but the opinions based upon them are conflicting. Because of the accidental nature of the experimental investigations thus far carried out, detailed descriptions of the processes involved in the aberrant bone formation have not been available. The authors therefore decided to carry out further investigations as regards the mode of origin, growth, and detailed structures of the bone as well as the probable part played by cartilage and calcium salts in initiating this bone formation.

Thirty-nine rabbits were divided into three series. In the first series of 20 animals the renal vessels were ligated on one side. In all but 1 animal the left side was chosen. In 2 of the animals the ureter was included in the ligation and resection. In the second

series of 14 rabbits portions of the ear and xiphoid cartilages were resected and transplanted into the subcutaneous tissue of the same animal. In a few instances these cartilages were boiled in water before transplantation. The 5 animals comprising the third series were subjected to subcutaneous and intramuscular injections of calcium salts, consisting of calcium chloride and calcium carbonate, and of sodium phosphate.

The animals were killed at various intervals in order that the changes brought about by the experiments might be followed progressively. The tissues were fixed in 4 per cent formaldehyde solution, decalcified in a mixture of phloroglucin and nitric acid, embedded in celloidin, and stained in hæmatoxylin and eosin. In some instances the Weigert-Van Gieson method of staining was used to differentiate the tissues. Many of the kidneys were sectioned *in toto* in order that different areas might be studied.

Before reviewing the new points brought out by their experiments the authors discuss the extent to which they were able to corroborate the observations and views of previous investigators. Unlike Liek, who used a method similar to theirs in studying the rabbit kidney, they did not find evidence of bone formation as early as sixteen or twenty days after ligation of the renal vessels. This failure was probably due to differences in the rate at which vascularity was restored. Neither did they observe in the early stages of bone formation in the kidney the close juxtaposition of the bone and the calcium deposits noted by Lick. On the contrary, in the earliest stage the bone was located under the epithelium of the pelvis farthest from the calcified tubules. Prior to the time when the epithelium of the calices had grown out to the lime placques no bone was found in the cortex of any of the kidneys.

As to the manner in which connective tissue is transformed into bone, two distinct processes have been hitherto described by numerous writers. According to these views, either a hyaline connective tissue or scar tissue may be converted directly into bone or calcified materials are eroded with the formation of vascular areas containing young connective-tissue cells some of which take on the function of osteoblasts. The histologic pictures presented by the authors' specimens probably represented three different types of transformation. The first and most frequent was the accumulation of young fibroblasts in the area under the transitional epithelium to form a sort of membrane which deposited bone cells. The bone increased in size by progressive ossification with inclusion of cells of the periosteum-like membrane. Second in frequency was the type described by Liek, Rosenstein, Pearce, and others, in which there was direct transformation of hyaline connective tissue into bone. This process took place only in the presence of pre-existing bone and therefore was not considered a primary process. The third type, in which cells of the vascular granulating tissue which eroded calcium deposits became converted into osteoblasts, was observed only in 1 of the 13 specimens showing bone formation.

The theory that heteroplastic bone was formed as a result of the stimulation of young fibroblasts by lime salts was based mainly upon the recorded fact that the bone formation took place in the immediate vicinity of the calcium deposits, since Liek and many others were unable to confirm the statement made by Barth that the injection of calcium salts or the implantation of dead bone would stimulate bone formation. In the authors' series of cases in which calcium injections were given no evidence of bone formation was observed as late as fifty days after the injection. In pathologic calcification followed by ossification other factors than the mere presence of calcium salts were perhaps involved and these as yet undetermined factors might be essential to heteroplastic bone formation. It seemed evident that in a richly vascular tissue cells a few millimeters away from the relatively insoluble salts were bathed by a tissue fluid of practically the same composition as that found in any other part of the body. Close proximity between the bone and lime salts was not found in the series. However, it was impossible to exclude the possibility that the young connective-tissue cells received a stimulus from the calcium salts at the time they first migrated into the necrotic areas poor in blood supply and that bone was formed when vascularity was restored and the area had become again comparatively free from calcium.

In the cases of ossification in the cartilage in which endochondral bone formation was observed evidence pointed toward the stimulation of fibroblasts by almost direct contact with the calcified matrix of the cartilage. When a connection between cartilage and bone could not be established and the process of ossification resembled that in the kidney described as the first type, stimulation by calcium might have played a part since, as Wells and Benson have shown, even the cartilages that did not ossify had some affinity for calcium and absorbed the salts from the tissue fluids. It was not improbable that under favorable conditions fibroblasts coming in contact with such cartilage might be caused to differentiate into osteoblasts.

The authors conclude that bone formation in the rabbit kidney with ligated vessels took place: (1) through the activity of young fibroblasts which accumulated to form a membrane-like structure; (2) subsequently by direct ossification of hyaline connective tissue in continuity with preformed bone; and (3) through erosion of lime placques by granulating tissue and the laying down of lamellar bone by cells derived from fibroblasts.

Bone formation in the rabbit kidney began not in direct contact with calcium deposits, but in the loose vascular connective tissue close under the transitional epithelium of the calices.

In cases of autotransplantation of ear cartilage in the rabbit there was an active new formation of cartilage in the connective tissue which surrounded

the transplants and the bone was formed by the fibroblasts from the perichondrium which eroded and invaded the calcified areas in the new cartilage.

The process of bone formation in the kidney was similar to that found in normal membranous ossification, while in the transplanted ear cartilage the process was identical with endochondral ossification.

G. E. BEILBY.

Stillman, E. G., and Bourn, J. M.: Biological Study of the Hæmophilic Bacilli. *J. Exper. M.*, 1920, xxxii, 665.

The authors report the data obtained during an investigation of the hæmophilic bacilli recovered from the throats and sputum of patients suffering from acute influenza and lobar pneumonia and healthy persons. The study includes the determination of: (1) the final hydrogen-ion concentration, (2) sugar fermentation, (3) indole production, (4) nitrate reduction, and (5) gas production. In addition to the strictly hæmophilic organisms, bacillus influenzæ and the so-called "bacillus X" described by Pritchett and Stillman, a few strains of bacillus pertussis, the bacillus of rabbit septicæmia, and bacillus bronchisepticus were included for comparative study.

As the hæmophilic bacilli were delicate organisms which did not grow readily on artificial media, special attention was paid to the minute details of the technique. Before the use of special media such as oleate sugar and chocolate agar the bacillus influenzæ was cultivated with difficulty and this fact probably accounts in large part for our lack of knowledge regarding its biology. A freshly prepared medium adjusted to the optimum hydrogen-ion concentration, pH 7.3 to 7.5, was essential for growth.

Upon isolation the majority of the strains of bacillus influenzæ and all the strains of bacillus X were plated on dextrose agar to which no hæmoglobin had been added. In no instance was growth obtained in the hæmoglobin-free medium. After prolonged artificial cultivation, which in some instances was continued over two years, all these strains were again plated on ascitic dextrose agar without hæmoglobin. Invariably, however, they failed to grow on such media. All media used in this study were enriched by the addition of 4 per cent defibrinated rabbit blood or 2 per cent blood extract. In the case of the hæmolytic bacillus X the latter was substituted for defibrinated rabbit blood as the hæmolysis produced by this organism masks certain reactions. In many instances also in the work with the non-hæmolytic hæmophilic bacilli (bacillus influenzæ) blood extract was used to enrich the media when defibrinated blood might have interfered with the determination of a reaction. The extract was made according to Wollstein's method.

The small Gram-negative hæmophilic bacilli which gradually came to be considered as belonging to one group of organisms and to which the name "bacillus influenzæ" was given appeared to be rather a group of closely allied bacilli which had demonstrable biological differences. The bacillus which Pfeiffer first described and associated with clinical influenza was not questioned as being the etiological factor in the spread of this disease. However, the percentage of cases in which the bacillus of Pfeiffer was recovered was great enough to indicate that the organism was at least a secondary invader. Since the first description of this hæmophilic bacillus in 1892 by Pfeiffer little has been added to our knowledge regarding its biological characteristics.

In this study the authors found that the hæmophilic bacilli observed divided themselves naturally into two large groups according to their ability to hæmolyze whole blood. The hæmolytic group comprised the organisms originally described as bacillus X by Pritchett and Stillman and were found in normal mouths. Because of the almost universal use of chocolate medium many of these hæmolytic bacilli were no doubt confused with the non-hæmolytic variety. On oleate agar the colonies were so similar that they could not be distinguished, and morphological differences were so slight that they could not be regarded as reliable. Organisms of the hæmolytic type (bacillus X) did not live so long in culture media as those of the non-hæmolytic type. They were best preserved at a low temperature. A few strains were found to live from two to three weeks if kept in blood broth in the ice chest, but to preserve them successfully in stock cultures it was necessary to transplant them every six or seven days. At room temperature bacillus X survived about five days, while at 37.5 degrees C. it remained viable about ten days. The non-hæmolytic group (bacillus influenzæ), on the other hand, remained viable in blood broth for a month or more at room temperature.

A tentative classification, graphically illustrated in this article, defines a small subgroup of the hæmolytic group formed by the strains which produce indole and gas but do not ferment saccharose. These strains appeared to ferment sugars less readily and further study was necessary to determine whether the indole-producing strains were also gas producers. The greater number of hæmolytic strains, however, did not produce indole or gas, but fermented saccharose.

Although the number of strains of bacillus influenzæ employed was too small to warrant any definite conclusions, it appeared that the non-hæmolytic bacilli isolated from persons suffering with, or recovering from, respiratory infections and those isolated from normal mouths during the epidemic period differed biologically in certain respects from the strains recovered from normal persons during the winter of 1919–20.

The Gram-negative bacilli which were not hæmophilic and which were studied because of their morphological similarity were easily differentiated from the hæmolytic and non-hæmolytic hæmophilic bacilli of the influenza type.

Both the hæmolytic and the non-hæmolytic groups of bacilli are further subdivided by the authors according to their ability to produce indole, to form gas, and to ferment certain carbohydrates. The hæmophilic bacilli of both the hæmolytic and the non-hæmolytic varieties reached a final hydrogen-ion concentration of about pH 6.4 when grown in meat infusion broth containing 1 per cent of dextrose. In addition, practically all the strains possessed the power to reduce nitrates to nitrites.

G. E. Beilby.

Meader, P. D., and Robinson, G. H.: Biological and Physical Properties of the Hæmotoxin of Streptococci. *J. Exper. M.*, 1920, xxxii, 639.

The isolation of hæmolytic streptococci from many different pathologic lesions demonstrates their importance as pathogenic organisms. Various investigators have pointed out two types of these organisms, one of which produces hæmolysis only on blood agar, while the other produces also a hæmolytic substance, or hæmotoxin, in bouillon. Whether or not all laking of erythrocytes as exhibited on blood-agar plates by different strains is the result of the same reaction has not been made clear. However, the ability to produce hæmotoxin in bouillon seemed to be a definite characteristic of certain strains of streptococci. Hæmolytic power being a biological function of most virulent streptococci, the authors were interested to determine the nature of the hæmotoxin.

Frequent attempts have been made to separate hæmotoxin from the organisms by filtration. Filtration was of the first importance in showing whether the hæmotoxin was in solution form or contained within the bacterial cells. Aronson (1902) stated that hæmotoxin would pass through a filter. Besredka (1901), using a Chamberland filter, noted a relation between the rate of filtration and the hæmolytic strength of the filtrate and suggested that perhaps the active substance was retained in the pores of the filter. Ruediger (1903) stated that the filter should be carefully selected as if it is too fine it will remove the hæmolytic property. Von Hellens (1913) and Nakayama (1919) were able to obtain hæmolytic filtrates only with considerable loss of potency during the procedure. Maasen filters were used in their experiments. M'Leod (1911–12) and Braun (1912) were able to secure hæmolytic filtrates by the use of Maasen filters. Lyall (1914) was not able to obtain hæmolytic filtrates by the use of coarse Berkefeld filters.

Owing to the contradictory results reported in the literature the repetition of much of the work on this subject seemed necessary. The object of the investigation reported in this paper was to determine if possible the nature of the hæmotoxin by studying its filterability, the effect of absorptive agents, the effect of centrifugalization and shaking, and the basic substances from which it is produced.

The results of these experiments indicated that as long as the phospho-proteins were present in the medium the maximum amount of hæmotoxin was produced and that the addition of phosphorus compounds restored, in part but not completely, the hæmotoxin-producing properties of the medium. The non-production of hæmotoxin in phosphorus-free bouillon was not due to the lack of buffer action as the reaction was unchanged by the growth of the streptococci and presented a range within which hæmotoxin had been produced repeatedly.

The authors concluded that the hæmotoxin of streptococci is a labile substance affected by centrifugalization or shaking and adsorbed by various organic and inorganic substances. Hæmotoxin was produced within a wide range of hydrogen-ion concentrations. It was neither in nor on the bacterial cell but free in the culture medium. It is probably not an enzyme. There were at least two substances which were essential to the medium for the elaboration of hæmotoxin. One of these is phosphorus, the other, a substance of unknown composition. The unknown component was present in small quantities in unfiltered muscle infusion, but was more abundantly supplied by blood serum and kidney infusion. This substance was not an albumin, globulin, primary or secondary proteose, meta-protein, or peptone of the medium or enriching fluid. It was water-soluble, was destroyed by boiling in alkaline solution and prolonged heating, and was removed to a considerable extent by passage through a diatomaceous filter. G. E. Beilby.

Kahn, A.: The Logical Cause, Pathology, and Treatment of Brain Lesions; an Experimental Paper. *Laryngoscope*, 1920, xxx, 809.

In order to ascertain the logical cause, pathology, and treatment of brain lesions of otological origin, Kahn conducted a series of animal experiments.

From these investigations he learned, first, that absorption from the subdural space is quicker than absorption in the peritoneal cavity; that in operations upon the brain the element of shock is very much greater than in operations in the peritoneal cavity; and that reaction upon the part of the system to infections within the brain is slower in comparison to its reaction to infections in the peritoneum, but absorption is quicker.

Kahn's primary object in performing these experiments was to learn if he could infect a dog, allow him to go to a point at which death from infection seemed imminent, and then bring into play some force which would keep the dog from dying. He first opened the peritoneal cavity and introduced dust from the laboratory floor. In these experiments the dog recovered practically invariably without any interference on the author's part. In another experiment Kahn injected streptococci and staphylococci into the peritoneal cavity and blood stream of dogs. The results were the same. He then placed in the peritoneal cavity small pledgets of gauze saturated with pus taken from dogs which had died just previously from a purulent infection, and also pure pus without gauze. When pus alone was

used, the dogs became immediately very ill and many of them died within twenty-four hours but the postmortem examination often showed no reaction whatever. In other instances when pure pus was used there was evidently an endeavor on the part of the system to react and throw up a defense for the peritoneal cavity was inflamed and purulent. When gauze containing dust from the laboratory was used, the systemic reaction was very slow, the dog recovered, and on postmortem examination the gauze was found to be walled off. When gauze saturated with pus was used, the reaction was more intense and quicker than when gauze with dust was used. The dogs became very ill but some of them recovered. At the postmortem examination the gauze was found to be either entirely or nearly entirely walled off.

The practical conclusions drawn from these experiments are:

1. It is not the infectious organisms alone or dirty material containing these bacteria of a non-animal character that is dangerous, but the absorption of the débris resulting from the strife of the tissues on the one hand and the invasion of the infecting organisms on the other which is responsible for the toxæmia and fatal outcome in these cases of peritonitis, meningitis, etc.

2. Clinically, the more important process is the systemic toxæmia. This is what causes death.

3. Any serum treatment to be devised in the future will owe its success or failure to its ability or lack of ability to overcome the débris resulting from the infectio-inflammatory combat, and will not be based upon the activity of bacterial life in the laboratory. In other words, it will be probably an autogenous serum.

In the experiments reported Kahn also injected directly into the blood vessels of some of the animals weak solutions of citrate of soda and blood which were not sterilized. The animals were not in the least affected.

The present methods of treating brain lesions are practically all surgical. Kahn believes that successful treatment in the future will develop along lines tending to immunize the system to the invading organisms until the cells are able to localize the infection. Two methods suggest themselves to him. First, he believes it may be possible to make a serum. The second method consists of the transfusion of blood from one person to another and back again over a period of time or at frequent intervals. Kahn has never tried this method on human beings, but his success in animal experiments leads him to believe that it would be perfectly safe when applied to the human subject. The technique used in the animal experiments is described briefly as follows:

The peritoneal cavity of the dog was infected in the various ways described. It was found that within twenty-four to forty-eight hours a dog reached the height of his infection and that if he were not given a transfusion death resulted. Therefore a transfusion from a healthy dog was given within from twenty-four to forty-eight hours after the infection. The dogs treated in this way almost invariably recovered. In several instances the transfusion was continued for a period of from thirty minutes to two hours so that there was a continuous circulation of blood between the two animals.

In a transfusion given in this manner the toxic blood passes over to another animal and the toxin in the infected animal is ultimately reduced just one-half. It must be remembered that the blood passed from the diseased animal to the normal animal contains substances which will cause the organs of the normal animal to react and form an additional amount of immunizing substances so that the force of resistance will be increased. If after a lapse of from twenty-four to forty-eight hours the diseased animal is given another transfusion from the same normal animal, his blood will be still further re-inforced by antitoxins. This may be repeated until the local point of infection is walled off and the diseased animal is able to take care of himself.

Kahn considers the method of continuous transfusion much superior to the injection of saline solution or the usual transfusion of blood.

G. W. HOCHREIN.

ROENTGENOLOGY AND RADIUM THERAPY

MacCarty, W. C.: Chronic Gastric Ulcer and Gastric Carcinoma. *Am. J. Roentgenol.*, 1920, vii, 591.

The author considers in this paper: (1) the pathology of simple chronic gastric ulcer and gastric carcinoma, (2) the co-existence of the two conditions, (3) the question of carcinomatous change occurring in simple ulcer, and (4) the practical application of the findings. The observations are based on a study of 507 chronic simple ulcers and 895 carcinomatous ulcers operated on at the Mayo Clinic.

Gastric ulcers may be single, multiple, acute, chronic, or carcinomatous, and may occur in any portion of the stomach. They may be large or small, shallow or deep. Chronic gastric ulcers larger than 2 cm. in diameter are usually, but not always, carcinomatous. The converse of this, however, is not true, because many ulcers less than 2 cm. in diameter are carcinomatous. When associated with ulcer, the carcinoma always involves the mucosa, and usually one or more of the other coats.

In simple chronic ulcer with no evidence of carcinomatous change the mucosa at the margin of the ulcer contains tubules which are essentially normal. The living epithelial cells are columnar, and their long axes correspond to the radii of a circle. The nuclei are ovoidal and uniform in size, being about one-third the volume of the entire cell. The tubules themselves may be distorted, and there is usually a lymphocytic infiltration of one or more of the stomach coats. The base of the ulcer is necrotic and the general course of the scar tissue is perpendicular to the surface of the crater.

Another type of chronic ulcer, grossly indistinguishable from that just described, has as its sole visible difference a change in the type of cell which lines the tubules in the marginal mucosa. Instead of the orderly columnar cells, ovoidal or spheroidal cells line the tubules. The nuclei of these cells have increased to about one-half the total cell volume. Another conspicuous difference is the presence of one or more definite and distinct nucleoli in the cells. Loss of uniform cell relationship is another distinguishing feature, that is, the long axis of the cell may run in any direction although the position of the cells is morphologically intratubular; they are indistinguishable from cells that are known definitely to be carcinomatous.

The third type of chronic ulcer shows the same gross and microscopic picture as the type just described with but a single difference. The ovoidal nucleated cells are no longer confined to the lumen of the tubules, but may be found free within the stroma. Sometimes they are only in the mucosa, but whenever they are at the base of an ulcer or in coats other than the mucosa, they are found also in the mucosa. When they occur only in the mucosa, the gross appearance of the ulcer is not always altered. Sometimes they appear in all coats with no alteration in the gross appearance.

On the basis of these data MacCarty approaches three commonly raised questions: Does carcinoma develop on chronic gastric ulcer? How frequently does this change occur? Does the change develop in the base or at the margin of the ulcer? A scientific answer cannot be made to any one of these questions because there are no positive or negative facts regarding the development of carcinoma which can be demonstrated in the study of simple and carcinomatous ulcers. Furthermore, a carcinoma has not been produced on an experimental gastric ulcer. Valuable practical deductions may be drawn from the foregoing facts as follows:

1. Every patient with a chronic gastric ulcer may be harboring a carcinomatous ulcer. The differentiation may be possible only to a trained surgical cytopathologist.

2. The roentgenologist, surgeon, or pathologist who knows that an ulcer is more than 2 cm. in diameter can guess with a fair degree of accuracy that the ulcer is carcinomatous.

3. The ideal treatment of a chronic gastric ulcer is resection or excision. Subsequently the specimen should be submitted to a competent cytopathologist.

H. W. BACHMAN.

Pendergrass, E. P., and Pancoast, H. K.: A Case of Pedunculated Adenocarcinoma of the Stomach and Possible Errors in Diagnosis. *Am. J. Roentgenol.*, 1920, vii, 602.

The case of pedunculated adenocarcinoma of the stomach reported is of interest because of the similarity of the roentgen findings to those of two other cases, also reported, which subsequently proved negative. In the former a number of persistent filling defects were visualized which were interpreted as due probably to papilloma or carcinoma, or possibly to sarcoma. Operation revealed a small pedicled mass which frozen section demonstrated to be an adenocarcinoma. The two negative cases also showed small filling defects at first but re-examination after an interval failed to reveal them.

In order to discover what would cause filling defects like those observed the authors gave a patient some grapes with his breakfast and then examined his stomach with the X-ray six hours later. No filling defect was found. A second patient was requested to swallow the pulp of an orange but in this case also the examination six hours later was negative. A third patient was given grapes and requested to swallow some of them whole. An examination made immediately thereafter revealed large filling defects. Apparent filling defects, therefore, cannot always be taken as positive evidence of an organic lesion and a second examination should be made after an interval of several weeks in order that the first diagnosis may be confirmed or disproved.

ADOLPH HARTUNG.

Strathy, G. S.: A Further Study of Liver Atrophy by X-Ray Examination. *Canadian M. Ass. J.*, 1920, x, 1073.

It is the purpose of this paper to describe Strathy's method of measuring the liver and to discuss the difference between the roentgen-ray shadows of normal and atrophic livers more fully than was done by the author in a previous article. Attention was first drawn to the possibility of detecting atrophy of the liver accurately in a roentgen examination by the acute angle formed by the juncture of the shadows of the upper surface of the liver and the vertebræ in cases of salvarsan poisoning.

Measurements of a large number of normal livers were made and, allowing for differences in build, the size and shape were found to be almost constant. The method of measuring was as follows:

With the patient standing behind the fluorescent screen, the level of the upper surface of the liver was marked on the skin in the right parasternal and nipple lines at the end of normal expiration. To prevent error this was repeated at least once. The level of the lower surface of the liver in the same lines, at the end of expiration, was then marked on the skin and the horizontal distance between these two markings measured and recorded. It was found that the depth of the liver shadow was greater in the standing position than in the recumbent position. The liver apparently rotates somewhat on a horizontal axis when the position of the body is changed. The depth of the liver varied from 5½ to 6½ in. in the right parasternal line and from 6½ to 7½ in. in the right nipple line. The normal outline of the liver shadow was as follows:

The upper border followed closely the shadow of the inner surfaces of the lower ribs on the right side and curved upward and inward with the shadow of

the diaphragm, meeting the shadow of the vertebræ and sternum usually at a right angle but sometimes at an obtuse angle. It then extended from the left side of the shadow of the vertebræ and sternum where it merged with the heart shadow and met the stomach bubble about 3 in. from the midline. When the patient was standing the lower border extended from 1 to 2 in. below the costal margin on the right side and crossed the midline, forming an angle of approximately 70 degrees with the vertical to meet the stomach bubble just below the heart.

Variations from the normal appearance may be due to displacement of the liver or a change in its size. Only a few cases of liver hypertrophy were seen. In these there was little change in the contour of the upper border of the liver shadow. In cases of atrophy there was a decrease in the vertical or the transverse measurement of the liver shadow or in both. A decrease in the transverse diameter of the liver was more commonly found than a decrease in its depth. This was usually shown by the shifting of the left border of the liver to the right rather than by the displacement of the right border to the left. The latter condition, however, was noted occasionally. When the right border of the liver remained close to the ribs and the left border was contracted to the right, this was shown by the fact that the hepaticovertebral angle became acute and the upper surface of the liver more dome-shaped. The stomach bubble was then seen farther to the right than normal and in some cases reached the left border of the vertebral shadow.

With the shrinking of the liver on the left the heart was frequently displaced to the right. With this shrinking of the transverse diameter the depth of the liver shadow may not be decreased and may be actually increased. In other cases the lower border of the liver assumed a more nearly perpendicular position than normal. The acute hepaticovertebral angle is the most striking sign of liver atrophy but it was found also to a slight extent when the left lobe of the liver was displaced downward by fluid in the left pleura, as in pleurisy with effusion or hæmothorax, and when a very large heart pressed on the liver through the diaphragm. It was found in one of over a hundred normal persons examined. In the lighter cases of atrophy there may be no decrease in the depth of the liver shadow, but in the more marked cases it is always present.

In conclusion the author suggests that atrophy of the liver is more common than is generally believed. He has found it in catarrhal jaundice as well as in jaundice due to arsenical poisoning. It is recognized that many cases of chronic dyspepsia are slight cases of atrophic cirrhosis and this may be diagnosed by roentgen-ray examination only when the liver shadow is carefully studied. ADOLPH HARTUNG.

Henderson, M. S.: Osteocartilaginous Joint Bodies. *Am. J. Roentgenol.*, 1920, vii, 588.

The author has observed loose osteocartilaginous joint bodies in the elbow, the shoulder, and the knee. In the knee, the joint most frequently affected, these bodies seem to be due to several conditions, including osteochondritis dissecans, hypertrophic arthritis, and osteochondromatosis.

Osteochondritis dissecans, which usually develops before the fortieth year of age, is thought to be caused by the blocking of the end artery supplying an area of the internal condyle just back of the insertion of the posterior crucial ligament. This condition may be bilateral. The X-ray rarely shows more than two or three bodies. It reveals also a depression on the internal condyle. In hypertrophic arthritis fragments of the osteophytic growths may become detached in the knee and, nourished by the synovial fluid, increase in size. The X-ray may show several of these bodies, large and irregularly shaped, with marked arthritic changes. Persons with this type of growth are usually over 40 years of age. In osteochondromatosis large numbers of bodies are formed from the thickened synovial membrane. These may be considered as benign neoplasms.

Loose bodies in the elbow have been observed following hypertrophic arthritis and osteochondromatosis.

In one case multiple bodies in the shoulder joint re-formed one year after their removal. The etiology was not established. J. I. MITCHELL.

Wetterer, J.: The X-Ray Treatment of Malignant Growths (Die Strahlenbehandlung der boesartigen Geschwuelste). *Strahlentherapie*, 1920, x, 758.

In cases of inoperable tumors, in which it does not seem probable that X-ray therapy alone would be of benefit, as much of the tumor as possible should be removed by operation before the X-ray treatment is begun. Regional lymph-gland metastases following the removal of the primary tumor should be treated by the X-ray alone rather than by operation. This applies also to local recurrences. Every case operated on should receive X-ray treatment. In addition to the X-ray, radium also should be used in cases of malignant tumors. Under certain circumstances even chemicals such as enzytol and glandular extracts may be of value.

The harmful after-effects of X-ray therapy may be local or general. Deep brown pigmentation of the exposed field should be guarded against. Intensive treatment of the mucous surfaces easily leads to dangerous œdema. Sometimes in intensive treatment of large abdominal tumors a generalized circulatory disturbance may be produced, i.e., X-ray cachexia. Therefore it is recommended that such treatments be distributed over several days and that the blood be examined frequently.

The author denies that too-small doses may stimulate the growth of tumors, but advises against the use of small doses as their effect is overcome by the tumor's tendency to grow.

Regarding the indications for X-ray therapy for carcinomata in different locations, Wetterer is of the opinion that operation is more effective than the X-ray in cases of operable uterine cancers, but that

X-ray therapy is of great importance in preventing recurrence. Contrary to the majority of authors Wetterer believes that even in cases of sarcoma radical excision followed by X-ray treatment is the method of choice. HARMS (Z).

Quick, D.: Pre-Operative and Postoperative X-Ray in Carcinoma of the Breast. *Am. J. Roentgenol.*, 1920, vii, 597.

Since the results of surgical treatment alone for breast cancer are far from reassuring, much is to be hoped for from other methods. The value of post-operative roentgen therapy has been attested by numerous authorities, as has also the importance of roentgen treatment of the open wound at the time of the surgical operation. The author believes still greater benefits may be derived from one or more cycles of roentgen therapy given both before and after operation. The formation of metastases would be rendered less probable by the tendency of the roentgen-ray to occlude the lymph channels along which metastases spread. In some instances inoperable cases may be rendered operable as a result of retrograde changes produced by radiation. An illustrative case is cited in detail.

At the Memorial Hospital within the last two or three years each case of primary breast cancer has been referred to the roentgen department for a complete cycle of treatment and in doubtful or borderline cases the decision regarding subsequent surgical intervention is delayed for a period of from two to four weeks. Before treatment is begun, a careful radiographic examination of the chest is made to determine, as far as possible, the status of the pleura and mediastinum. The cycle of treatment follows a routine plan up to a certain point and is then varied to meet the needs of the particular case. In all instances the involved breast and the pectoral, axillary, infraclavicular, and supraclavicular regions on the same side are treated as a routine. When the growth presents clinical evidence of malignancy, a wider field is covered so that the epigastric region, a wide skin area around the breast, the inner half or all of the opposite breast, and the opposite axilla and and supraclavicular region are included. The skin over all available portals of entry is marked off into areas from 2½ to 3 in. square and massive doses are applied to each in the course of a number of days. The fixed factors in these exposures are an 8-in. skin-target distance, a 9½-in. parallel spark-gap back-up, 7 ma. of current through the tube, and usually 4 mm. of aluminum filter.

After the cycle of treatment has been completed in this manner, the patient is placed under the observation of the surgeon and roentgen therapeutist. Cases belonging to the strictly operable class are operated upon two weeks after the completion of the roentgen cycle. Those more advanced are given another cycle of treatment at an interval of four weeks. After one or two cycles, some of the cases which were inoperable at first show sufficient improvement to place them in the operable group.

A study of the material removed at operation after this pre-operative treatment shows that the surgeon had a less malignant type of tumor to deal with. The neoplastic cells show marked degenerative changes, and the replacement of tumor tissue by fibrous tissue indicates a reparative process. The atrophy of lymphatic channels aids materially in blocking the dissemination of the disease.

Postoperative treatments are begun as soon as the patient is able to be out of bed following the radical operation. Three complete cycles are given at intervals of a month in exactly the same manner as the pre-operative radiation. Then, after from four to six months, a fourth cycle is given. In the extremely malignant types the monthly cycles are continued for some time. ADOLPH HARTUNG.

Dautwitz, F.: Contributions to Radium Treatment (Beitraege zur Radiumbestrahlung). *Mitt. a. d. Grenzgeb. d. Med. u. Chir.*, 1920, xxxii, 297, 316.

Dautwitz reports the results he has obtained with radium in the last five years. He applies the radium in a flat container holding a large amount of the element and does not introduce it into the tumor itself or into wounds made by operation. For external use the maximum amount of radium should not exceed 100 mg. and the exposure should be from twelve to twenty hours. For vaginal and rectal use, up to 30 mg. of radium may be employed. The treatments should be separated by an interval at least eighteen hours in length and series of treatments should be separated by a period of at least six weeks. A schedule of dosage for the various diseases is impracticable because of the marked differences between the various cases.

Radium should not supplant surgical treatment or the X-ray altogether. There are cases, however, in which the X-ray is of no value while radium is beneficial. In the author's cases the damage done by radium was relatively slight, consisting, for example, merely of cicatricial muscular contractions following treatment of malignant tumors of the neck and, rarely, ulceration. Lupus and skin cancers, however, disappeared only after the development of a radium ulcer but the latter heals well, leaving only a fine scar. The results in cases of hæmangioma, tuberculous lymphoma, myelogenous and lymphatic leukemia, and splenomegaly were very good. They were good also in the anæmias and in cases of myomata and climacteric hæmorrhages. In cases of lupus erythematosus and vulgaris and carcinoma of the skin longer radium treatment was very effective; the scars became softer and more elastic, and Dupuytren's contracture was benefited. Good results were obtained also in cases of thyroid malignancy, inoperable carcinoma of the breast, and carcinoma of the lip, cheek, jaw, and larynx. In cancer of the tongue, however, they were poor. In cases of tumors of the rectum, stomach, and mediastinum radium therapy often ameliorated the symptoms, and in cases of lymphatic growths it delayed the course of the condition. GRASHEY (Z).

Bowing, H. H.: Topical Applications of Radium. *Am. J. Roentgenol.*, 1920, vii, 582.

In the Mayo Clinic the terms "milligram hour," "erythema dose," "distance screening," etc. are used with reference to the application of radium. Milligram hours are determined by multiplying the amount of radium employed by the number of hours it is applied. An erythema dose represents 1,000 milligram hours of radium delivered to a square inch of skin surface at a distance of 1 in. and filtered through the silver wall of the applicator (0.5 mm.) and 2 mm. of lead. In the majority of cases there is no erythema, but if it does develop it is usually transient and responds readily to simple treatment. The term "distance screening" indicates that some substance, such as cork, wood, or gauze, has been interposed between the radium and the skin surface overlying the radiated area.

In treating primary carcinoma of the breast with or without metastasis a thorough radiation is indicated both before and after operation. Patients with recurring carcinoma of the breast with or without metastasis improve under radiation; at least ulceration and sloughing are prevented. An erythema dose is delivered to each square inch of skin surface overlying the growth and is repeated in six weeks until activity is no longer demonstrable. X-ray treatment is repeated every three weeks until eight or ten applications have been given, when it is stopped for three months.

The round-cell sarcoma responds readily and the melanotic sarcoma poorly to radium and X-ray therapy. The spindle-cell and giant-cell sarcomata respond more favorably than the melanotic type. Radium in erythema doses is applied over the involved areas and supported by the deep cross-fire method of X-ray treatment through the posterior and lateral abdominal and thoracic walls if the involvement is confined to the chest or abdominal cavities. This combined treatment is repeated every three months if necessary.

The application of radium is identical in cases of acute and chronic Hodgkin's disease, the treatment being given over the involved lymphatic groups in erythema doses. An enlarged spleen is treated by applying a 50-mg. tube over six areas for four hours in each area. If the roentgenogram shows thoracic, abdominal, or pelvic involvement, deep X-ray therapy is applied to these areas.

Simple tuberculous adenitis offers the best result when radium is applied in doses ranging from 500 to 1,000 milligram hours, depending on the size of the glands. General hygienic and dietary measures are also instituted. The treatment is repeated every six weeks until all signs of activity have disappeared. Large doses of radium are given in acute cases of splenomyelogenous leukemia in order to secure the development of the chronic state. The amount of radium used is 100 mg. in the acute cases and 50 mg. in the chronic cases. Six to eight areas are mapped out over the spleen and the radium is applied for four and three hours respectively. When there is lymphatic enlargement radium is applied over each group for the same length of time. This treatment is repeated each week for three or four weeks. If the hæmoglobin and red cells decrease, the treatment is discontinued and a six weeks' rest is given. All patients are supported by medical treatment.

A. C. JOHNSON.

Bagg, H. J.: The Action of Buried Tubes of Radium Emanation upon Normal and Neoplastic Tissues. *Am. J. Roentgenol.*, 1920, vii, 536.

The author reports on the results of an investigation to answer the following questions which arose concerning the use of buried emanation tubes in tissues:

1. Is the effective area of radiation about the emanation tubes, i.e., the area in which the tumor cells were destined to undergo degenerative changes, the same for all practical therapeutic purposes for the tubes of 5 mc. strength (which was about the strongest tubes used) as for tubes of half that strength, or even for a fraction of 1 mc.? This question is of considerable practical importance from the standpoint of the most economical and efficient use of the available radium.

2. Assuming that the above question is answered and the practical dose has been determined, how far apart should the radium emanation tubes be placed to radiate efficiently a given mass of tumor tissue?

3. Do the various types of tissues exhibit about the same reaction to the same dose?

4. Do the clinical results show that properly distributed small doses of buried emanation produce the desired results with greater safety and less pain and discomfort to the patient than a comparatively large dose of radium per tube? And, in this connection, can tumor destruction be obtained without extensive sloughing?

The investigation was carried out by inserting small emanation tubes by means of a trocar into normal rat tissues, Flexner-Jobling rat carcinomata, and human carcinomata. The tubes varied in strength from 0.1 mc. to 5.5 mc. They were left in the normal animal tissues from thirteen days to several months, and in the Flexner-Jobling rat carcinomata for from twenty-four hours to several days, before histologic examinations were made. As controls for the experiments tubes which were recovered from previously treated tissues and had lost their radio-activity were again inserted by the same technique into other living tissues.

The author found that the area of radiated tissue does not increase in direct proportion to the amount of radium present, for when the radium was doubled the rays were not able to produce lethal effects twice as far into the tissues. When relatively strong tubes are used, the small depth of 5 mm. of tissue about the tube, i.e., 1 cm. in diameter, is radiated for a longer time than is necessary to produce the death of the cells. The effects of the gamma ray, which occur farther away from the tube and appear later, are no doubt somewhat greater when relatively

strong tubes, such as those containing 5 mc. of radium, are used than when tubes containing about 1 mc. are employed, but it has been difficult to test this point because of the prompt reduction in the total size of tumors treated in this way.

The localized effect of buried radium emanation was found to be practically the same in carcinoma of the prostate, experimental animal cancer, and normal tissues. In order to treat a given mass of tumor tissue effectively with an even distribution of radiation, the emanation tubes should be embedded about 1 cm. apart. W. L. BROWN.

MILITARY SURGERY

Rottenstein, G., and Courboules, R.: The Evolution of 270 Cases of War Fractures; Methods of Treatment and Results (Sur 270 cas de suites éloignées de fractures de guerre; méthodes employées et résultats). *Presse méd.*, Par., 1920, xxviii, 846.

The authors have treated 270 soldiers suffering from the sequelæ of war fractures. Such conditions may be classified as: (1) fistulous osteomyelitis; (2) fistulæ without osteomyelitis; and (3) pseudarthroses with or without nerve lesions. In this article only the first two varieties are dealt with.

The great majority of these cases had been treated by débridement and extraction of foreign bodies. Primary suture had been done in only 10 or 12 instances. The persistence of osteitis cannot be attributed either to insufficiency of the primary operation or faulty technique. Most of the men had undergone secondary operations consisting of curettage and extraction of fragments. It appears to the authors that the persistence of fistulæ was due especially to insufficiency of the secondary operations.

Before fistulous osteomyelitis is treated anteroposterior and lateral radiographs should be made to determine the operative indications.

The operative incision greatly surpasses the presumed extent of the lesions. Wide and complete excision of cicatricial tissue and of any tissues which have undergone degeneration is necessary. The periosteum is stripped with an Ollier rugine. The osseous cavity having been exposed, its edges are abraded and all disease foci are removed. It may be necessary to make this intervention very extensive, continuing it even to the diaphyses of the bone. This first operative step is the same for all varieties of bone lesions. The following steps vary according to the nature of the lesion. If the affected area is very extensive and the opening is large, the cavity is tamponed for twenty-four hours with gauze wet with Dakin solution. At the first dressing a sufficient number of Carrel tubes to irrigate the entire lesioned area, even to the slighest recess, are inserted. The tubes are open at their extremity and every two hours a sufficient quantity of Dakin solution to give complete saturation is injected. Compresses are placed between the tubes to prevent too rapid closure of the wound. At the end of a few weeks the open tubes are replaced by closed tubes which are left until complete cicatrization has occurred. In the authors' cases secondary sutures have never been necessary.

If the lesions are limited in extent and infection seems less severe, the muscles and aponeurosis are sutured over the Carrel tubes. The free extremities of the tubes are closed for the first twenty-four hours and the Dakin injections then begun.

In all cases of fistula without osteomyelitis and showing surface osteitis only, the wound was sutured over the inserted Carrel tubes. Recovery resulted.

Of the 270 patients treated by the authors, 92 had surface wounds only or had been operated upon recently and recovered without a second operation. The 178 others were treated by the methods described. Sixty-two returned to their homes in good condition, while 208 were transferred in good condition to prosthetic depots after a period of control of not less than six weeks following cicatrization. W. A. BRENNAN.

LEGAL MEDICINE

Bosard, R. H.: A Few Words on Malpractice Suits. *J.-Lancet*, 1921, n.s. xli, 38.

Fractures are the most common cause of malpractice suits. In certain cases, after treatment for some time, the physician instructs the patient to come back for an examination, but the patient lets the matter run for six months or a year and then, finding a poor result, goes to some other physician for the operation which his own negligence, rather than the fault or negligence of the surgeon, has made necessary.

In one case in which a fracture of the arm was reduced, the patient fell from a train three or four days later while intoxicated. When the physician was called he requested the patient to allow him to manipulate the arm to ascertain whether the fall had disturbed the bones. The patient refused to permit this, but finally consented to have an X-ray examination made. After removing the sling and outer bandages the physician left the patient and went into another room to adjust his X-ray machine. When he was ready for the examination, he found that the patient had left the office without the sling or bandages. The patient never returned, but eventually appeared at a lawyer's office with a bad arm and brought suit against the physician for malpractice. The physician had a record of his treatment with the dates, and the date at which the patient called after the fall. Moreover, there had been two persons in his office who remembered distinctly the patient's statements as to his fall, his refusal to allow the physician to manipulate the arm, and his consent to have the X-ray picture taken, who saw the sling and bandages removed, and who knew that the patient left the office before anything further could be done. This case was finally dismissed.

It is important for every physician and surgeon, therefore, to keep his records up to date so that matters therein to be contained, such as dates, conditions, symptoms, treatment, etc., and, in cases of fracture, occurrences such as falls, too early use of the limb, or any happening apt to cause a poor result without fault on the part of the physician, and the names of persons who knew of the facts at the time, may be set down before they are forgotten.

When a poor result is discovered, another physician should be called into consultation at once so that he may be acquainted with the facts, the history of the accident, the treatment, etc., and may view the result and judge from the facts and the result whether the treatment was proper and the attending physician was without negligence.

When a patient comes for consultation and the physician finds a defect due to a poor result from the reduction of a fracture, the physician should acquaint himself with the history of the accident, the treatment, etc. as shown by the record of the attending physician before he passes judgment on the treatment.

Ordinarily the plaintiff in a malpractice case must rely upon the testimony of a physician to prove negligence on the part of the defendant physician amounting to malpractice. The plaintiff proves his witnesses' preparation for his career, such as college degrees, hospital training, and general practice for a number of years. He then asks him what is termed a hypothetical question. This is supposed to embrace all of the facts which have been testified to in the case relative to the accident, injury, or illness, the physician's diagnosis, and the treatment. He then usually asks: "In your opinion was that treatment correct and proper for the injury or illness described?"

The witness must carefully analyze the question in all its aspects before giving his answer. It is possible, and in fact quite probable, that the facts stated are not sufficient to justify an opinion and in that case he very frequently answers: "I cannot answer that question." The witness may also point out to the counsel, in his answer, wherein the facts are not sufficiently definite to allow him to formulate an opinion as to whether the treatment was or was not proper. The plaintiff testifies as to what he claims to be the facts with reference to the accident, injury, or illness, and as to what he claims to be the facts with reference to the treatment given by the defendant physician. While this may be disputed by the physician in his defense, nevertheless, if the facts as stated by the plaintiff are all the facts in connection with the matter and are put in a hypothetical question, and if the witness is asked the hypothetical question and he answers that in his opinion such treatment would not be proper and that the poor result was, or might reasonably be considered as due to such treatment, the plaintiff has won his case.

The plaintiff may refer to the fact that he suffered an accident which resulted in a fracture of his forearm; that the defendant physician, when called, did not at once attempt to reduce the fracture and replace the bones in their normal condition, did not apply a plaster of Paris cast, and applied loosely fitting splints only after a few days; and that eventually the arm reached its present condition. The physician called to testify must therefore be alert and before expressing his opinion as to whether or not the treatment was or was not proper, should know what conditions confronted the defendant physician at the time he administered the treatment. If the facts are sufficient and the question is not sufficiently full to give the information, he is justified in stating that he cannot answer the question or that the treatment was probably correct.

There is also one other fact which must be borne in mind at all times by physicians who are called upon to give expert testimony. This is that when there are two or more known and used methods of treatment, one considered by some, possibly by all, as the best and most approved treatment, while the others are treatments which have been used and still are used to some extent and have been considered proper, even though they are not those most generally approved, he should be careful in considering that the treatment given was not proper treatment merely because it was not the treatment most approved and most recently developed.

The physician who is the defendant in the action is liable for malpractice for failure to use the ordinary skill and judgment of physicians in the vicinity in which he was practicing or in similar vicinities. A physician in a rural district where he does not have access to X-ray apparatus and other improved means of determining the exact condition and rendering treatment accordingly would not be held to the same degree of care and skill as the physician who is practicing in a city hospital with all the latest appliances at his command. A physician is not liable strictly for an error in judgment if he has made a careful examination and diagnosis and determines upon a certain method of treating the particular ailment or injury as the best in his judgment under all the circumstances. If the physician testifying prefers some other method of treatment he is not justified in condemning his fellow practitioner for deciding otherwise on the facts when both treatments are universally used.

J. A. CASTAGNINO.

Evidence of Other Surgeons as to Care and Skill.
Shaw vs. Klein (Miss.), 83 So. R., p. 620.

A physician and surgeon performed a minor surgical operation and the patient instituted suit for damages because of alleged negligence. Judgment was rendered in favor of the physician. The patient, however, claimed error was committed in the trial because several surgeons testified that the defendant was a careful and skillful surgeon. The Supreme Court of Mississippi held this was proper.

J. A. CASTAGNINO.

Liability from Loss of Drainage Tube Not Shown—Evidence. *Burris vs. Titzell (Iowa), 177 N.W.R.*, p. 557.

The plaintiff in this case had been affected with pleurisy and pneumonia. A surgical operation was performed with an aspirating needle to drain the pus in the pleural cavity. The local physician drained a quart of pus from the cavity but found the disease difficult to treat as it had been preceded by alcoholism. The patient then went to the State hospital at Iowa City where she was treated by the defendant. He diagnosed her condition as empyema. An incision about 2 in. long was made between the seventh and eighth ribs and a drainage tube inserted. The tube was fastened to the patient's body by suture. The physician saw the patient twice daily but the wound was dressed by nurses and internes.

About ten days after the insertion of the drainage tube its disappearance was discovered. The plaintiff claimed that the defendant placed the tube carelessly and negligently. It was disclosed by the evidence, however, that the tube was properly placed. The manner in which it escaped was unknown.

Inasmuch as the plaintiff's claim was that the tube was insecurely fastened and the trial court permitted evidence to be given that the wound was dressed by nurses and internes with the physician's consent, the Supreme Court of Iowa reversed a verdict rendered in favor of the patient.

J. A. CASTAGNINO.

GYNECOLOGY

UTERUS

Haret and Grunkraut: The Raised Pelvis in the Radiotherapy of Uterine Fibromyomata (De la position du bassin relevé dans la radiothérapie du fibromyome utérin). *Presse méd.*, Par., 1920, xxviii, 877.

The authors draw attention to the advantages offered by the Trendelenburg and genu-pectoral positions in the radiotherapy of uterine fibromyomata. In either one of these positions the abdomen is emptied as the small intestines fall into the diaphragmatic cavity and nothing intervenes between the abdominal wall and the pelvic organs.

Besides giving a clearer view, these positions are of value because they protect the small intestine against the X-rays. The importance of such protection is no longer a matter to be demonstrated. Vomiting, abdominal meteorism, diarrhœa, and collapse have been reported after X-ray treatment of the pelvic organs, and in 1917 one case of death due to intestinal lesions caused by the X-ray was reported. The glandular and lymphatic nature of the small intestine explains its susceptibility to the rays.

The Trendelenburg position should be chosen when the radiotherapy is to be given by the anterior route, and the genu-pectoral position when it is to be given by the posterior route.

In either case the operator should be assured first of the mobility of the small intestine. This can be ascertained by radioscopic examination after a test meal and observing the position of the intestine when the patient is in dorsal decubitus and then with the pelvis raised. W. A. Brennan.

Wood, J. C.: Cervical Tears. *J. Am. Inst. Homœop.*, 1920, xiii, 515.

In this article the importance of repairing cervical tears is discussed and the following modified trachelorrhaphy is presented:

Either lip of the cervix is grasped with a small volsellum forceps. The upper angle of the cervical tear on one side is secured in a third forceps, and with a scalpel a double V-shaped incision is made. The apex of the second V approaches the center of the lips in such a way as to undermine the mucous membrane of one side with the exception of the portion which lies immediately beneath the cervical canal to be created. A sufficient amount of the interstitial tissue is removed with this plug to restore the cervix to its normal size. If nearly all of the diseased tissue is removed, the two lips are easily approximated with through-and-through catgut sutures so that the entire operation may be performed easily in from ten to fifteen minutes. Not all of the diseased tissue can be removed because a few distended glands will necessarily remain immediately underneath the newly created cervical canal. Fortunately, however, these disappear as the circulation of the cervix is restored, and a perfectly normal cervix as regards both size and function remains. C. H. Davis.

Gonzalez, J. B.: Longitudinal Ruptures of the Inferior Segment of the Uterus (Las roturas longitudinales del segmento inferior del utero). *Semana méd.*, 1920, xxvii, 813.

The technique employed by Gonzalez in the repair of longitudinal ruptures of the inferior segment of the uterus is described as follows:

The anterior and posterior lips of the cervix are seized near the edge of the rupture with cervical forceps with four teeth. The operative field is illuminated by the use of two single-valved vaginal specula. A guiding hand, usually the left, is then introduced.

The posterior margin of the rupture is caught close to its upper limit with a forceps with two teeth. It is important to include the entire thickness of the uterine wall. The opposite margin of the rupture is then caught somewhat lower down with another forceps.

Sutures are next introduced, beginning usually within a centimeter of the upper limit and crossing each border separately, the point of the needle always being protected with the index finger of the guiding hand so that no tissues of neighboring organs will be included in the suture. The higher forceps is shifted below the lower as the sutures are continued downward.

When the uterine body is not well contracted, a gauze pack is inserted into the entire uterine cavity. Otherwise the lower segment only is packed. The pack should be loose or tight depending upon whether drainage or compression is desired.

In cases of hæmorrhage which cannot be controlled by the usual procedures the author delays suture and applies a special forceps with four teeth along the borders of the rupture until bleeding ceases. In this case the forceps should include the entire length of the rupture and the entire thickness of the uterine wall. When hæmostasis is complete the rupture is repaired as described. W. R. Meeker.

Fowler, W. F.: Cervical Laceration, Cystocele, Prolapsus Uteri, and Multiple Fibromata. *N. York M. J.*, 1920, cxii, 712.

In the case reported the Mayo procedure for cystocele and uterine prolapse was used. The tubes and ovaries were not removed. The operation was prolonged because of the difficulty in the hysterec-

tomy due to the situation of the fibroids and because it was decided to wait ten days before repairing the perineum. Recovery from both operations was uncomplicated.

On the basis of the results of the treatment in this case and a careful study of the literature the author draws the following conclusions:

1. A thorough gynecological examination three months after delivery should be routine practice.

2. The disability following cervical laceration is dependent upon subsequent pathologic conditions rather than upon the tear *per se*.

3. Premature or precipitate labors following amputation of the cervix are probably due to some other factor than the loss of tissue.

4. Operative morbidity and mortality will be decreased by the substitution of a several-stage operation for one prolonged operation.

5. The advisability of conserving the normal ovaries in hysterectomy is still undetermined.

R. T. La Vake.

Bissell, D.: The Management of the Cervical Stump and the Round and Broad Ligaments When Performing Supravaginal Hysterectomy. *Surg., Gynec. & Obst.*, 1920, xxxi, 578.

The following conclusions are drawn:

1. If the action of the round ligaments when they are anchored to the cervical stump effects a change in the position of the cervix, this change of position must be toward the symphysis and from the coccyx, and as the normal position of the cervix is in the immediate region of the coccyx, any marked change of its position toward the symphysis constitutes a displacement.

2. If, when the round ligaments are anchored to the normally situated cervix, the position of the cervix after operation is found to be maintained, it is proof that the anchored round ligaments have had no influence upon the position of the cervix as the direction of this influence, if any, must be toward the symphysis.

3. A normal fascial diaphragm maintains the cervix in a normal position independently. Its action is constant and its resistance greater than that of the round ligament. Therefore the influence of the anchored round ligaments upon the cervix must be nil when the fascial pelvic diaphragm is normal.

4. If the posterior area of the fascial diaphragm is stretched by a retroposed corpus or a tumor in the cul-de-sac of Douglas so as to advance the cervix toward the symphysis, shortening the uterosacral or posterior ligaments is a more logical procedure than anchoring the round ligaments to the cervical stump.

5. If the entire fascial diaphragm has been injured sufficiently to permit the cervix to advance and descend toward the vulva and if an intra-abdominal removal of the corpus is deemed advisable, the corpus should be removed without reference to the position of the cervix, the vaginal vault being corrected subsequently by overlapping the fascia of the anterior vaginal wall.

6. No adequate proof has yet been offered to show that the round ligaments, when anchored to the cervix, maintain in the slightest degree the normal position of the cervix or restore a displaced cervix to normal.

7. Prolapse of the cervix does not and cannot occur after supravaginal hysterectomy if previous to the operation the fascial diaphragm is uninjured and the cervix is in normal position. C. H. Davis.

Gibson, G.: Cancer of the Uterus in Young Women. *Am. J. Obst. & Gynec.*, 1920, i, 273.

The author reports six cases. One of the striking points in the histories is the fact that the first four patients all married early, at 19, 17, 16, and 17 years of age, respectively. Of the five who have borne children, four developed the cancer comparatively soon after a pregnancy, sixteen months, three and one-half years, four years, and five months.

In only three of the cases was it possible to perform a radical operation with any hope of success, and in these the disease had given rise to symptoms for a comparatively short time, three months, two months, and two months respectively. In the first there was beginning infiltration into the parametrium.

In the three other cases only a palliative operation could be considered and death resulted soon afterward. In these the symptoms had been present for four months, five months, and six months, respectively.

The following conclusions are drawn:

1. Cancer of the cervix occurs with sufficient frequency in young women to make it imperative to keep the condition in mind.

2. Epithelioma is the type generally found.

3. The growth is much more rapid in young persons than in older persons and a radical operation is possible only when the case is seen in the first three months.

4. The extension is especially rapid when the parametrium becomes involved, and death follows comparatively soon. E. L. Cornell.

ADNEXAL AND PERI-UTERINE CONDITIONS

Coventry, W. A.: Lutein Cysts Accompanying Hydatiform Mole. *Am. J. Obst. & Gynec.*, 1920, i, 266.

Two cases showing several very interesting features are presented. In one there were very large multilocular cysts in each ovary which somewhat clouded the development of the mole. In the other case two large tumors the size of a fist were found one month after the removal of the mole. The uterus was large and flabby and about the size of a two months' pregnancy. A hysterectomy was done.

In both their gross and their microscopic appearance these cysts differed decidedly from the ordinary type of ovarian cysts and from the lutein cysts

normally appearing during pregnancy. Undoubtedly they accompany only the formation of chorion epithelioma and mole.

The author finds in the literature many references to cysts of the ovaries in association with pregnancy, mole, or chorioma, and small cysts which disappeared spontaneously after expulsion of the mole or fœtus. Cysts such as he describes in this article, however, are uncommon.

The treatment consists of operation. In Coventry's opinion the surgeon is justified in not waiting for recession of the tumor. E. L. CORNELL.

EXTERNAL GENITALIA

Eastman, J. R.: Silver Wire in Vesicovaginal Fistula. *J. Indiana M. Ass.*, 1920, xiii, 393.

Eastman states that, regardless of the type of operation, silver wire is superior to any form of catgut for the repair of vesicovaginal fistulæ. He has carried out several experiments in an effort to determine why this is true, but has failed to prove anything definite. He concludes, however, that silver wire stimulates the tissues.

A description is given of the author's retention catheter in which the usual olive tip is replaced by four hoops which retain the catheter in position without obstructing its lumen. W. H. CARY.

MISCELLANEOUS

Engelbach, W.: Endocrine Amenorrhœa. *Med. Clin. N. Am.*, 1920, iv, 665.

In 4 cases used for demonstration by the author the chief complaint was amenorrhœa. In 2 of these cases the condition was due to pituitary insufficiency; in the third, to ovarian insufficiency; and in the fourth, to thyroid insufficiency. Only classical cases in which there was a decrease in the secretion of these endocrine glands sufficient to produce amenorrhœa of some duration were selected. Three of the patients were 18 years of age.

These frankly positive cases were chosen in order to demonstrate as forcibly as possible the gross diagnostic points denoting insufficiency of the three important endocrine organs mentioned and to emphasize the influence of their secretion upon menstruation and genital function.

The strikingly complete insufficiencies described by the author are not common, but minor degrees of deficiency in each of the glands mentioned resulting in less complete suppression of the menses, dysmenorrhœa, metrorrhagia, loss of libido, frigidity, and sterility are among the most frequent complaints of female patients. A careful study of the classical and extremely conspicuous "hormonic signs" noted in the cases presented was helpful in the diagnosis of the milder forms. Moreover, it supplied much information concerning the inter-relationship of the endocrine glands and the hormonic effects of their secretions upon other organs and metabolic processes.

The author is confident of the correctness of the diagnosis in the cases presented as those due to pituitary insufficiency were counterparts of similar clinical cases reported by Lorain, Levi, Bell, Rennie, Kuemmell, and Falta. These patients had the very unusual combination of a markedly arrested osseous and genital development, amenorrhœa, and the absence of other genital functions without the adiposity of Froelich's disease. This syndrome is explained only by one endocrine dystrophy, viz., insufficiency of the anterior lobe of the pituitary gland without additional involvement of the posterior lobe of the hypophysis. In the case due to thyroid insufficiency the history and all the minute markings were those of a pre-adolescent insufficiency of the thyroid associated with long periods of amenorrhœa which reacts completely to simple thyroid treatment. The case due to ovarian insufficiency was a case of extreme gonadism with the most classical osseous anomalies of this disorder and a refractory amenorrhœa of more than two years' duration. Various other symptoms, such as pernicious vomiting, emaciation, and angioneurotic œdema, were also present. The patient reacted to treatment with ovarian substance. The three types are described simultaneously in order to accentuate, by contrast, the difference in the hormonic signs characterizing these disorders. All local causes for amenorrhœa were excluded by repeated examination and in one case an exploratory operation was performed.

The treatment of the menstrual disorders described consisted of simple exhibition of the deficient hormone in sufficient dosage. In the majority of the cases of adolescent hypothyroidism increasing doses of thyroid were given by mouth until the maximum dose tolerated was reached or the symptoms were relieved. The earliest sign of thyroid intoxication was taken to be a tachycardia above 100, providing the pulse rate was below 80 before the institution of treatment. This tachycardia was considered the best physical measure of the patient's tolerance. The dose tolerated was usually decreased by ⅛ or ¼ gr. and then continued for a few weeks to obtain further information regarding its effects upon the symptoms. At this time, if the general symptoms had not been improved, the basal metabolic rate was determined to discover whether it had been restored to normal. If it had been restored to normal, the dosage given was believed to be correct and the same treatment was continued for a number of months. If material improvement was not noted at the end of two or three months a re-examination was indicated to determine the correctness of the diagnosis. If the symptoms were relieved by a smaller dose it was found best to use the smallest dose which would give relief. The author states that he is uncertain whether or not, after the symptoms have disappeared and the periods have been restored to normal, it is advisable to increase the dosage to the point necessary to restore the basal metabolic rate.

In the treatment of the eunuchoid female a different rule was followed in measuring the dose of ovarian substance indicated in the individual case. In such cases the basal metabolism did not serve as an index to the dosage, and the only dependable guide was the reaction to this therapy in the form of improvement in the clinical syndrome.

Various preparations made by a number of pharmaceutical manufacturers are on the market under different names. "Ovarian substance," made from the corpus luteum and stroma of the ovary, contains both the internal and external secretions of the ovary.

The results obtained by the author have led him to the conclusion that the thermic test is of little value in the diagnosis or as a measure of the dosage necessary. If at any time the pituitary symptoms are increased, he stops the treatment. For example, typical pituitary headache or an exaggeration of the ocular, gastric, or uterine signs following the injection of this extract indicate that a mistake has been made regarding the activity of the secretions of this lobe, hypersecretion instead of a hyposecretion being present. On the other hand, if the relief of symptoms is very marked, there being freedom from attacks of cranial, ocular, and gastric symptoms for long intervals, marked relief of muscle fatigue, regularity and increase in the amount and duration of the menses, improvement in libido, and improvement or relief of sterility, it is proof of the beneficial effect of this medication. G. E. BEILBY.

Smith, R. R.: Hæmorrhages into the Pelvic Cavity Other Than Those of Ectopic Pregnancy. *Am. J. Obst. & Gynec.*, 1920, i, 240.

Except in cases of tubal pregnancy the ovaries give rise to intraperitoneal bleeding more frequently than any other of the pelvic organs or structures. There is apparently a good reason for this as they have little firmness, their blood supply is large, and they are in a constant state of morphologic and functional change from puberty to the menopause. Menstruation and ovulation with extrusion of the ovum occur each month. At this time the follicle fills with blood. The pelvic organs are congested during menstruation and to a lesser degree during coitus. Displacements of the uterus and large tumors in the pelvis are apt to favor ovarian hæmorrhage by blocking the return circulation.

Clinically the cases of ovarian hæmorrhage may be divided into three groups: (1) those due to rupture of the normal graafian follicle or corpus luteum; (2) those due to a condition known as "hæmatoma ovarii"; and (3) those occurring in ovarian cysts or solid tumors. Several cases are reported. E. L. CORNELL.

Ogilvy, W. A.: The Afferent Nerve Supply of the Female Genito-Urinary Organs and the Bowel. *Practitioner*, 1920, cv, 421.

A more definite knowledge of the afferent nerve supply of the viscera would simplify the earlier diagnosis of disease for the practitioner and enable him to seek the assistance of the surgeon at the time when the greatest good can be obtained by operative measures.

It appears that the tenth thoracic nerve supplies the functionating portion of the kidney, the ovary, and the small bowel, all of which are highly functionating structures; the eleventh thoracic nerve supplies the upper branching extremity of the ureter, the uterine tube, and the ascending and transverse colon; the twelfth thoracic nerve supplies the ureter, the uterus, and the descending and sigmoid colon, all of which are comparatively passive carriers except that the large bowel has an absorbing function; the first lumbar nerve supplies the bladder, rectum, and uterus, all of which are organs of convenience; and the third and fourth sacral nerves supply the trigone and urethra, the os, the vagina, and the anal canal, all of which are outlets.

E. L. CORNELL.

OBSTETRICS

PREGNANCY AND ITS COMPLICATIONS

Litzenberg, J. C.: Microscopic Studies of Tubal Pregnancy. *Am. J. Obst. & Gynec.*, 1920, i, 223.

As the uterus and tubes are genetically identical and therefore composed of the same tissues the same reaction to pregnancy might be expected in the uterine and tubal elements. Careful observations demonstrate that the physiological scheme is followed exactly in both the uterus and the tube; in the latter, however, the results are pathologic from the beginning because the ovum is implanted in an organ entirely unfitted anatomically for its reception or development.

In a series of cases studied decidual cells were always found in the basal layer but in some specimens only after laborious hunting through numerous serial sections. However, even though decidual cells may be found in the area called "decidua basalis," true decidua is never present. In the tube, on account of the absence of decidua, there is erosion of the unprotected dilated vessels in the musculature, causing a hæmorrhage in the intervillous spaces instead of a normal blood supply. This hæmorrhage is sometimes so profuse that the villi are displaced and crushed together, the ovum capsule is distended beyond its ability to resist, and the blood bursts through into the tube lumen.

The author has found decidual cells more frequently in the capsularis than in the basalis in spite of the fact that hæmorrhage is constantly present in the capsularis and masks the cell elements. That there is a capsularis which is the analogue of the decidua capsularis of the uterus is shown.

The "inner ovum capsule," as it has been well called, is inherently weak, does not expand and grow with the ovum as does the true decidua, and is also further weakened by eroding villi. Hence it ruptures easily.

The fact that the ovum of an extra-uterine pregnancy is frequently found protruding through the ostium abdominale of the tube is due usually, not to the expulsion of a separated ovum by the tube, but to the fact that in such cases the implantation of the ovum has occurred near the fimbriated extremity. The ovum is protruding, not because it is separated and being expelled, but because it is pushing through the end of the tube by virtue of its own growth and enlargement. This slowly dilates the abdominal opening of the tube and the ovum is not separated from the original site of implantation.

If the implantation is nearer the uterine end of the tube the termination will be either "external rupture" of the ovum capsule through the tube wall into the abdominal cavity or "internal rupture" through the inner ovum capsule into the tube lumen or, rarely, separation of the ovum, in which case it perishes and may become a tubal mole or may be pushed along toward the fimbriated end by the hæmorrhage but not by muscular action of the tube. In the author's opinion true abortion is rare. "Internal rupture" is a better term than "tubal abortion" for, although in a great majority of so-called unruptured tubes, hæmorrhage into the tube and from the ostium abdominale is the rule, it is not always due to separation of the ovum as in uterine abortion.

"External rupture" may be a true bursting of the weakened eroded tube wall under pressure from within due to the growth of the ovum or the distention caused by hæmorrhage, or it may be only an erosion by the villi. In the latter case the wound may be very small but death may result because a large vessel is opened. E. L. CORNELL.

Cron, R. S.: Glycosuria During Pregnancy. *Am. J. Obst. & Gynec.*, 1920, i, 276.

The author summarizes his article as follows:

A positive reaction with Fehling's solution during pregnancy does not necessarily indicate the presence of diabetes mellitus, being due usually to a lactosuria or alimentary glycosuria.

Lactosuria is common during both pregnancy and the puerperium. It is entirely physiological and must be differentiated from the various types of glycosuria.

A large number (from 30 to 50 per cent) of pregnant women are less tolerant to glucose than non-pregnant women. They have no hyperglycæmia and are not true diabetics.

Glycosuria may be due to a lowering of the renal threshold for sugar. Albuminuria and glycosuria may be associated with one another or alternate in the absence of hyperglycæmia.

Diabetes and albuminuria may be associated with one another. This complication in pregnancy is ominous and calls for immediate interruption of the pregnancy.

Diabetes and syphilis may complicate pregnancy. The treatment indicated is both dietary and antiluetic.

Pregnancy may occur in diabetic women and diabetes may become manifest during pregnancy. Either is a serious complication. Many patients progress well, but a considerable percentage die in coma or collapse or succumb to some intercurrent infection or during a successive pregnancy.

Leaving out of consideration abortions and premature deliveries, about 50 per cent of the fœtuses of diabetics are still-born or die within a few days following birth.

Fat is the most important factor in the production of acidosis. It should be reduced to a minimum or omitted from the diet entirely. Its only value is to meet the patient's caloric requirement.

If sugar appears to a slight degree in the urine of a pregnant woman it should be carefully watched and controlled by diet and, unless a carbohydrate equilibrium can be maintained, the pregnancy should be terminated. The advantages of the cæsarean section under gas-oxygen should be kept in mind.

Six cases are cited. E. L. CORNELL.

Durr, S. A.: Pregnancy Complicated by Influenza. *Surg., Gynec. & Obst.*, 1920, xxxi, 610.

During the recent recurrence of epidemic influenza there were 53 cases of acute epidemic respiratory infection among the pregnant women in Cook County Hospital, Chicago. These cases, together with a similar but larger group reported by Woolston and Conley, form the basis of this article.

The maternal mortality was about the same as in the epidemic of 1918–19.

The mortality and morbidity, while small in cases of influenza, were much greater when bronchopneumonia was a complication.

The incidence of abortion and pneumonia is greatly decreased by keeping the patients in bed from the time the diagnosis is made until recovery is complete.

Abortion is caused by toxæmia or insufficient oxygen in the maternal blood. Physical exertion is a contributary factor.

The virulence of the epidemic decreased steadily and markedly. E. L. CORNELL.

Durst: Pregnancy Complicated by Pulmonary and Laryngeal Tuberculosis and the Advisability of Inducing Abortion Because of These Complications (Komplikationen der Graviditaet mit der Lungen- und Larynxtuberkulose und die Frage des artifiziellen Abortus in Bezug auf diese Komplikationen). *Liječ. vijes.*, 1920, xlii, 144.

This article is a clear exposition of the development, history, and present views regarding the subject. There are three theories. At one extreme are those who believe that tuberculosis is never an indication for induced abortion, while at the other extreme are those who consider pulmonary tuberculosis in any stage or form always an indication for abortion. Between these extremes there is a third group of authors who believe that under certain conditions and in certain cases the induction of abortion is permissible or necessary. This viewpoint prevails today and is upheld by the author. In Durst's opinion latent pulmonary tuberculosis is not an indication for an induced abortion but active pulmonary tuberculosis, especially during the first four months of pregnancy, constitutes a definite indication. In this connection the author makes a distinction between the pregnant woman in good circumstances whom he treats expectantly and the woman in poorer circumstances for whom more active treatment is necessary. The opinion of an experienced internist should always be sought and followed. Tuberculosis of the larynx is always an absolute and urgent indication for the interruption of pregnancy.

Guided by these principles the author has induced 128 abortions in the cases of 117 women during a period of fourteen years. In these 128 abortions there were 2 premature labors (eighth and ninth months) and 8 late abortions (from the fifth to the seventh months); in all the others the abortion was performed between the second and fourth months. The relatively large number of abortions is explained by the fact that the maternity clinic in Zagreb is the only clinic for all of Jugoslavia. There were no deaths. KOLIN (Z).

Hillis, D. S.: The Treatment of Abortion. *Surg., Gynec. & Obst.*, 1920, xxxi, 605.

Hillis contributes the results of a statistical study regarding the relative merits of operative and conservative treatment of abortion, the basis of his investigation being more than 200 cases treated at the Cook County Hospital, Chicago. Two separate groups were studied, septic and non-septic cases. Cases with a fever above 100 degrees which were curetted showed higher fever after operation and longer convalescence than septic cases treated conservatively. It was found, however, that curettage could be safely and advantageously performed in cases of this type after they had been free from fever for five days.

In regard to non-septic cases the author reaches the following conclusions:

1. Curettage is necessary in 40 per cent of cases treated expectantly.
2. Curettage insures an empty uterus and prevents subsequent bleeding.
3. It shortens the patient's stay in the hospital.
4. It is relatively harmless. W. H. CARY.

Vanverts, J.: Abstention or Operation in Complicated Abortions (Abstention ou intervention dans les avortements compliqués?). *Rev. franc. de gynéc. et d'obst.*, 1920, xv, 361.

The author reviews 256 cases of abortion, 56 of which were treated by conservative measures and 200 by operation. The considerable number of operations is explained by the fact that the majority of the cases were complicated. The 56 cases treated by conservative measures were cases of simple abortion. The complicated cases may be placed in three classes according to the indication for intervention which was hæmorrhage, infection, or simple retention.

Hæmorrhage should be considered an indication for operation only if it is abundant. When the hæmorrhage is due to complete or incomplete retention it is impossible to give an absolute prognosis or to conclude that expulsion of the placenta will arrest the bleeding. Therefore it would seem wiser to evacuate the uterus as this is a sure method

of obtaining hæmostasis. The danger is slight if the evacuation is done according to accepted rules.

In 82 cases of curettage for hæmorrhage due to abortion there was only 1 death and this probably was due to delay in the treatment. Early intervention is necessary in all cases of severe hæmorrhage whether the ovum is still retained completely or there is retention of only a part of the placenta.

In cases of septic abortion it has been customary, at least in France, to empty the uterus. The author has not had any personal experience with conservative measures as in such cases he has always operated. In 99 cases of digital or instrumental curettage there were 93 recoveries and 6 deaths. The deaths were more frequent among cases of incomplete retention than those of complete retention. In 19 of these 99 cases the infection was not checked immediately by evacuation of the uterus. A pelvic abscess developed in 4, and in 2 cases a generalized peritonitis caused death. Emboli and phlegmasia developed in 1 case each. In 11 cases a generalized infection occurred. This was treated by turpentine injections; 6 of the patients recovered and 4 died. In one-fifth of the cases, therefore, evacuation of the uterus is insufficient to check infection, but it is incorrect to attribute to evacuation the complications which may ensue from a pre-existing sepsis. While the author limits himself to evacuation, he is of the opinion that other methods of treatment such as uterine drainage and hysterectomy have their proper indications.

In cases of retention systematic evacuation of the uterus obviates the dangers which are always present. In 9 cases which the author treated in this way recovery was normal. Vanverts is unable to understand what advantage there can be in conservative measures. Evacuation he believes is imperative if the placenta is not expelled by the end of twenty-four hours.

The objection that in evacuating the uterus there is danger of uterine perforation is well founded. The author has been obliged to perform a hysterectomy three times on account of this complication. As in all of these cases recovery followed, he does not believe that the fear of a perforation should change our opinion regarding the value of evacuation and the indications for the procedure.

W. A. Brennan.

LABOR AND ITS COMPLICATIONS

Ricard, J. C. A.: A Case of Dicephalus (Un cas de dicéphale). *Bull. méd. de Québec*, 1920, xxii, 65.

In Ricard's case two heads could be felt on abdominal palpation but only one heart was heard on auscultation. The first head was delivered in occipitopubic position, but it was impossible to effect the least movement of rotation. Intra-uterine exploration revealed a dead bicephaloid fœtus, the second head of which rested on the inlet.

To complete the delivery it was decided to sacrifice the disengaged head. This having been done, the labor was terminated after a simple podalic version. The first head delivered was normal but showed signs of asphyxia. The second head showed a hare-lip. The fœtus was fully developed, and of the feminine sex. It weighed about 10 lb. The woman made a normal recovery.

W. A. Brennan.

PUERPERIUM AND ITS COMPLICATIONS

Polak, J. O.: The Indications for Operation in Spreading Peritonitis of Postabortal and Postpartal Origin. *Am. J. Obst. & Gynec.*, 1920, i, 161.

Polak calls attention to the complete anatomical isolation of the pelvis which generally occurs following postabortal and postpartal peritonitis. The Fowler position, which is so universally employed in the prophylactic treatment of lower abdominal and pelvic inflammations, favors localization of the process within the pelvic cavity. If it were not for the fact that protecting barriers, such as the sigmoid, cæcum, ileum, and omentum, wall off the infective process, postabortal and postpartal infections would cause a much higher mortality; a pelvic peritonitis would be apt to become a general peritonitis.

When the uterus is entirely within the confines of the true pelvic cavity, the body is usually able to take care of the infection. In puerperal peritonitis, however, the large subinvoluted uterus blocks the organism's conservative measures in the localization of the infective process and general peritonitis is the result.

The author believes that if the symptoms of a spreading peritonitis appear when the usual conservative measures of treatment are employed, conservative treatment should be stopped and drainage should be instituted immediately, either vaginal or abdominal, depending upon the type of case.

From his study Polak has formulated the following conclusions:

1. In the large majority of peritoneal extensions the body is able to localize the lesions.

2. Advancing peritonitis has a definite syndrome which is constant when the inflammation is spreading.

3. In the presence of this syndrome drainage is necessary and definitely lowers the mortality.

H. B. Matthews.

NEW-BORN

Zerbino, V.: Methylene Blue in the Treatment of Pyelitis in Infants (El azul de metileno en el tratamiento de la pielitis del lactante). *Rev. med. d. Uruguay*. 1920, xxiii, 526.

Zerbino gives the clinical histories of cases of typical pyelitis in infants in which good therapeutic results were obtained with methylene blue. This is almost a specific in certain infections due to dysenteriform bacilli and the fusiform bacillus

causing Vincent's angina. Since pyelitis in infancy is usually of intestinal origin and the organisms concerned are the bacillus coli and bacillus lactis aerogenes, the use of methylene blue in this condition appears logical.

The route chosen for its application is justifiable also for the same reasons. From the intestines methylene blue acts first upon the point of origin of the infection. After absorption by the intestinal mucosa it follows slowly the same path traveled by the original infection. It is easily and rapidly eliminated by the kidneys and its influence is exerted upon the entire urinary tract. W. R. MEEKER.

MISCELLANEOUS

Kellogg, F. S.: The Unmarried Mother Before and After Confinement. *Am. J. Obst. & Gynec.*, 1920, i, 292.

The author draws the following conclusions:

1. Illegitimacy is a State problem.

2. At present little or no progress is being made with this problem in this country.

3. Under present conditions the best form of care for high-grade illegitimates requiring care outside their own homes—with a few exceptions—is given by the well-equipped, well-staffed maternity home.

4. The worst form of care for illegitimates under present conditions—with a few exceptions—is that afforded by public lying-in hospitals and maternity wards in public or semi-public general hospitals as the women are usually taken in only when they are in labor and are discharged too early.

5. The best form of care under present conditions for low-grade illegitimates—with a few exceptions—is afforded by the State institutions.

6. The medical and social service standing of the maternity homes should be kept as efficient as possible by placing them under the supervision of a State Board of Illegitimacy.

7. The chief reasons for lack of progress are inadequate facilities for classifying and recording the end-results, and for co-ordinating effort and expense.

8. Such machinery might be provided by a central clearing house with a staff made up of a representative of each agency under the directorship of a long-time chairman and the necessary physicians, social workers, and clerks.

9. The cost of such a board should be supplied by the agencies interested, including the Commonwealth.

10. In addition to the fact that a clearing center would reserve only the woman worth working over for the more expensively run agencies, it would be of equal or greater value economically in obtaining early segregation and observation of a large number of mentally deficient women whose mental condition is evidenced first by their pregnancy.

11. The problem of illegitimacy is big enough to be handled and should be handled as an entity, being directed legally, sociologically and medically (loosely at first until knowledge is accumulated) under one office. Any legislation such, for example, as a Maternity Pension Bill, should not include clauses concerning illegitimacy because it will increase the present too-great decentralization.

E. L. CORNELL.

GENITO-URINARY SURGERY

ADRENAL, KIDNEY, AND URETER

Legueu, F.: The Kidney Problem in General Surgery. *Am. J. Surg.*, 1920, xxxiv, 309.

The author's experience leads him to conclude that deaths in his clinic are due to renal insufficiency as evidenced by nitrogen retention in the body. He discusses at some length Ambard's method of determining the normal kidney function and its variation in disease. The remainder of the article deals with the value of this method of estimating the kidney function in cases in which nephrectomy or prostatectomy seems indicated. Legueu gives the following rules regarding nephrectomy:

1. "If the constant is below 0,100 and the disease is unilateral, nephrectomy can be done in safety.

2. "If the constant is above 0,100, the lesions are bilateral, the gravity of the disease being in proportion to the increase of the constant. In this instance nephrectomy is not forbidden but it is necessary to pay great attention to the high figures of the constant."

In prostatic cases the rules for drawing conclusions from the coefficient are somewhat different:

1. "If the constant is above 0,200, it is preferable not to operate.

2. "If the constant is below 0,100, the condition is fairly favorable for operation.

3. "If the constant is between 0,100 and 0,200, the general condition of the patient must be the guide in formulating an opinion as to the advisability of operation. These are the most difficult cases and the constant cannot be considered alone. Proper preparatory treatment may change an inoperable case with a high constant to an operable case with a safe constant." H. G. HAMER.

Maxwell, L. A. I.: Renal Efficiency and Hyperglycæmia. *Med. J. Australia*, 1920, ii, 551.

The normal percentage of sugar in the blood of healthy persons is subject to some variation, depending upon: (1) the amount and nature of the food ingested, (2) the time interval between the ingestion of the food and the blood analysis, and (3) the rate of conversion of glucose into more simple or more complex substances in the body.

MacLean regards 0.11 per cent as an average figure and many other observers give closely similar percentages.

Owing to faulty carbohydrate metabolism hyperglycæmia occurs in diabetes mellitus. Hyperglycæmia may lead to glycosuria, but obviously the elimination of glucose by the kidneys will depend upon the functional efficiency of these organs.

Pathologists have described a diffuse nephritis with fatty degeneration which occurs in diabetes. Hyaline changes are found in the tubal epithelium and the malpighian tufts.

The question as to whether in diabetes there is a change in the concentration of the blood was also investigated. Polydipsia would in itself tend to cause dilution of the blood stream, whereas polyuria would tend to cause its concentration. This problem was studied by the author in two ways: (1) the total solids of the blood were determined gravimetrically, and (2) the relative concentration of the serum in the different cases was determined by observing its refractive index. A further point investigated was the total fat and lipoid content of the blood.

As a result of this study the following conclusions are drawn:

1. Renal inefficiency was present in 58 per cent of the diabetics examined.

2. In cases of hyperglycæmia the blood-sugar determination should be interpreted only in the light of the renal efficiency.

3. In about four-fifths of the diabetics studied there was concentration of the blood as shown by increased total solids and a raised refractive index.

4. Lipæmia was not a marked feature of the series of cases studied. G. W. HOCHREIN.

Rowlands, R. P.: Hydronephrosis Due to Abnormal Renal Vessels Kinking the Ureter. *Proc. Roy. Soc. Med.*, Lond., 1920, xiv, Sect. Clin., 6.

Either a vein or artery or both passing toward the lower lobe of the kidney may hook the ureter and cause hydronephrosis. Almost invariably the abnormal vessels are derived from the main renal vessels. As a rule, but not always, they pass behind the ureter. They cause renal colic and intermittent hydronephrosis with little change in the urine. Renal calculi sometimes form in the dilated pelvis. Cystoscopy and pyelography may establish the diagnosis. Timely division of the offending vessels usually results in a cure, but in some cases ureteropelvic anastomosis is necessary to relieve secondary stricture or valvulation. In late cases nephrectomy may become necessary. The condition is little known and often overlooked even at operation.

The author presents the case of a married woman, 49 years of age. For eighteen years she has suffered with violent pain and swelling in the left loin. Seventeen years ago she had two operations: (1) tapping, (2) nephrorrhaphy. Relief followed for ten years. Since then she had had increasing attacks of pain and swelling in the left flank. The X-ray was negative as regards stone. The urine contained oxalate

crystals, a few pus cells, and a slight amount of albumin; bacillus coli was found on culture. The amount of urea in the blood was three times the normal. At operation the ureter was discovered to be constricted by an abnormal artery and vein passing behind it and kinking it at its juncture with the pelvis. C. R. O'CROWLEY.

Bard, L.: The Idiopathic Character of Pelvic Dilatation in Intermittent Hydronephrosis (Du caractère idiopathique de la dilatation du bassinet dans l'hydronéphrose dite intermittente). *J. d'urol. med. et chir.*, 1920, ix, 243.

Retention of urine in the condition known as "intermittent hydronephrosis" has been attributed to the presence of an obstruction at the mouth of the ureter or within the ureter. Certain clinical facts and surgical and autopsy specimens, however, have led Bard to the conclusion that it is due to an idiopathic dilatation such as may occur in any tubular organ. From the pathogenesis of such a dilatation and the fact that the urinary retention develops late it seems evident that the dilatation is primary, that it was established originally without retention of urine, and that the obstructions usually present—stricture due to spasm or internal or external inflammation—are only indirect consequences of the progressive and continuous development of the dilatation itself.

In support of his views the author refers to a case of intermittent hydronephrosis characterized by the absence of obstruction and hypertension in its first phases, and by the secondary appearance of constrictions and distention due to obstruction resulting from the progressive development of the primary pocket. W. A. BRENNAN.

Quinby, W. C.: Tumors Primary in the Ureter. *J. Urol.*, 1920, iv, 439.

The case reported was that of an unmarried woman, 40 years of age, who entered Peter Bent Brigham Hospital, Nov. 24, 1919. Her present illness began Nov. 7, 1919, when, after slightly unusual exertion, a dull aching pain was felt in the left side. This had been intermittent since, but never severe. There was no nausea, vomiting, fever, or bladder pain. As far as the patient was aware the urine was normal.

The physical examination revealed a very healthy appearing, middle-aged woman with no abnormality except that in the left side of the abdomen, below and external to the umbilicus, was a smooth, oval mass which did not move with respiration and was not tender but could be pushed about the abdominal cavity for a short distance with ease. Gastro-intestinal studies with the X-ray after the ingestion of barium gave no abnormal findings. The examination of the urine and blood was negative.

Cystoscopic examination showed the bladder to be normal and there was apparently a normal efflux of urine from each ureter. On the right side the ureteral catheter passed for the usual distance without obstruction. On the left side, however, it was stopped at 14 cm. and from this side the flow of urine was very slow. A pyelogram made after injection showed the left kidney in its normal position, and below this a definite distortion and obstruction in the ureter which was curved upward and slightly dilated. The shadow ended in an abrupt tip opposite the iliac crest. The kidney was slightly enlarged and the ureter was somewhat dilated above the obstruction. There was no evidence whatever of infection in the urinary tract. From the appearance of the X-ray plate it appeared that only two conditions could cause the findings; first, an involvement of the ureter by some extra-ureteral infection such as a broken-down retroperitoneal gland, or second and more probable, definite involvement of the ureter by a neoplasm. Palpation of the mass in the flank showed it to be entirely distinct from the kidney.

Under a pre-operative diagnosis of neoplasm involving the left ureter an operation was performed on December 10, 1919, by Cutler. The peritoneal cavity was entered through the left rectus muscle, the intestines being retracted toward the midline. A definite tumor mass lying beneath the peritoneum just to the left and below the bifurcation of the aorta into the common iliac arteries was at once exposed. Immediately over the upper pole of this small tumor mass, which was as large as a baby's fist and very firmly attached, ran the mesentery of the large bowel containing the inferior mesenteric artery, and immediately to the right of the mass, overlying a portion of it, lay the iliac vein. The tumor was intimately adherent to the peritoneum.

Immediately overlying its anterior surface, and in the peritoneum itself, was an elaborate meshwork of fine vessels. Search on either side did not reveal the ureter, and it was decided to attempt enucleation, making a search for the ureter as the definition of the tumor mass progressed. The peritoneum was therefore incised in an elliptical fashion at either border of the tumor, all the fine vessels being clamped and tied off. When it was thus freed from the peritoneum by blunt dissection it was possible to free the mass from the surrounding structures, especially posteriorly where it was very definitely adherent although apparently it lay within a definite capsule of its own. This fixity seemed to be due to the fact that it lay in the center of a sympathetic plexus.

It was necessary to divide innumerable small fibers during the progress of the operation. Without breaking into the tumor, however, it was possible finally to free it on both sides and beneath without cutting any very large vessel. At this stage the ureter was encountered at both the lower and the upper ends of the tumor mass through which this structure passed. The attempt was made to dissect the ureter free from the tumor mass, but when this was practically completed it was seen that the tumor grew into or from the ureter so that it became evident

that this procedure would leave much of the lesion behind. Therefore the ureter was dissected downward toward the bladder as far as possible and cut across. Dissection was then carried upward toward the kidney end of the ureter, and when the normal ureter was encountered, it was cut across.

As the pathologic examination of the tumor showed it to be probably malignant and also possibly of renal origin, a nephrectomy was done ten days later. The kidney was found to be entirely normal.

On January 4, 1920, the patient was discharged from the hospital in excellent general condition Recent examination showed no evidence of recurrence.

The tumor was a mesothelioma, probably of renal anlage origin. H. W. E. WALTHER.

BLADDER, URETHRA, AND PENIS

Ott, I.: A Rare Vesicopubic Penile Malformation (Di una rara malformazione vescico-pubopeniena) *Arch. ital. di chir.*, 1920, ii, 457.

The author reports a case of congenital vesicopubic malformation of the penis in a boy 10 years of age. The condition was clearly balanic epispadias. This type of epispadias is very rare as Burckhardt found only 5 cases of it in 60 cases of epispadias reported in the literature. The author's patient had a mass of cicatricial tissue about 2 cm. above the root of the penis. This represented the umbilicus and corresponded to the highest part of the urinary bladder. There was extrophy of the fundus of the bladder. The scar was flat or slightly embedded when the patient was in dorsal decubitus but prominent when the bladder was full. The lower part of the abdomen was short, the umbilical scar coinciding almost with the symphysis. Non-descent of the testicles, inguinal hernia, a pubic diastasis of about 7 cm., and minor pelvic malformations were noted.

The characteristics of this case resemble those noted in extrophy of the bladder. In discussing the evolution of the condition the author states that probably partial extrophy of the bladder, due to failure in the union of the pubic symphyses, and penile epispadias were present in the beginning and that these malformations were modified by intrauterine cicatrization which covered the ectopic bladder partly with normal tissue and partly with cicatricial tissue and changed the penile epispadias into the less marked balanic epispadias.

The patient had been subjected to a Bassini operation for inguinal hernia but no operation had been done for the approximation of the pubic symphyses or for reduction of the abdominal hernia. W. A. BRENNAN.

Watson, E. M.: The Developmental Basis for Certain Vesical Diverticula. *J. Am. M. Ass.*, 1920, lxxv, 1473.

The etiology of bladder diverticula has long been a subject of discussion among urological investigators. One school, to which Cabot belongs, contends that they are always of congenital origin. The other, which includes Lower among its members, believes that these vesical evaginations are practically always acquired.

Watson has recently made a very interesting study of the development of the vesical cavity from early fœtal life until birth. Variation and inequality of intrapelvic and lower abdominal pressure have been noted. This caused distortion of the bladder, its inner walls becoming extremely irregular with ridge-like elevations which stood out prominently in certain areas, especially in the zones about the lateral margins of the trigonum. The projections into the bladder were at times finger-like, and at others were simple ridges which never developed sufficiently to bridge the lumen of the bladder.

Watson contends that if the intrapelvic pressure becomes marked early in fœtal life the probability of a bridging of the vesical cavity is greater than when it develops during the later months of intra-uterine life. Varying degrees of irregularity were demonstrated in the specimens studied. Many cross-sections of fœtal bladders exhibiting these developmental defects are shown in the article. The author speaks of the factors which influence the size of such diverticula at birth. The fact that most of the diverticula were found in the region of the ureteral orifices he believes is due, not to the ureteral orifices themselves, but to the trigone which is covered at this time with from three to eight layers of epithelial cells. As these cell-layers thin out they show a marked tendency to project as slight ridge-like elevations which may go to form diverticula. The article presents strong arguments in favor of the theory that bladder diverticula are of congenital origin. H. W. E. WALTHER.

Caulk, J. R.: Infiltration Anæsthesia of the Internal Vesical Orifice for the Removal of Minor Obstructions; Presentation of a Punch Cautery. *J. Urol.*, 1920, iv, 399.

Caulk has devised an instrument similar to the Young punch. The outer sheath has no fang on the slot to hold it in position as when the electric cautery is used the coagulation due to the burning maintains the instrument in place. The obturator sheath has at its terminus an iridioplatinum blade instead of a knife blade. This blade is about ¼ in. wide and of substantial thickness. Caulk tried several smaller blades but they proved entirely unsatisfactory as they were too frail to withstand the pressure and the heat was imperfectly distributed. He has performed twenty punch operations with the blade described and it is still firm and in good condition. The blade is insulated from the main sheath of the instrument by mica plates. At the proximal end of the tube the current enters through a large contact point with screw attachment, one pole being connected with the tube itself and the other with a large copper bar brazed to the surface of the tube and insulated with silk and mica. The cord which carries the current from the rheostat

to the instrument is of large caliber and of practically the same size as the copper bar within the tube.

In order to burn tissue properly and prevent hæmorrhage the procedure must be carried out slowly under low heat. Otherwise the process is about the same as when a cold knife is used. As the heat in the blade must be sufficient to burn the tissue without heating the shaft of the instrument, the conductors in the author's instrument have been made large and of uniform caliber throughout so that they offer the minimum resistance to the current which is thus brought directly to the cautery blade, the only point of increased resistance. In this way an intense heat may be maintained for a sufficient period of time without heating the instrument. The inner sheath serves as a handle for manipulating the instrument. The burning is done best by a slow rotary motion. This is easily regulated by using the handle as a lever. There is no irrigating attachment to the instrument since dilation of the orifice is unnecessary and there is much less danger of short circuiting in a dry field.

With the Young punch the operation can be done nicely under local urethral anæsthesia induced with cocaine or novocaine for it is quickly over and the pain is tolerable. In an attempt to remove an obstruction with the cautery the procedure must be done slowly and a more profound anæsthesia is necessary. However, as the operative risks must be reduced to the minimum it is most desirable not to subject the patient to general or spinal anæsthesia. Sacral anæsthesia would be very effective for such operations, but this again falls into the category of major procedures. In observing the obstruction within the grasp of the instrument, it occurred to Caulk that it would be very simple to infiltrate the tissues of the orifice with novocaine through the outer sheath. Accordingly, he constructed a syringe somewhat on the order of the Geraghty utricle syringe. This instrument has a pistol handle connected with a tube (about a No. 7, French) to the end of which is brazed an iridioplatinum needle. An ordinary Luer syringe is connected with the silver tube at its juncture with the handle of the instrument. With this syringe the vesicle orifice may be easily infiltrated under the control of the eye. Caulk has used 1 per cent novocaine.

H. W. E. WALTHER.

Thomas, B. A.: The Treatment of Bladder Tumors, with an Analysis of 62 Cases. *J. Am. M. Ass.*, 1920, lxxv, 1395.

Thomas claims there has been much dissatisfaction relative to the end-results in the treatment of bladder tumors, notably carcinoma, and that hopes are now entertained because of the promises of electricity and radium. The results of incisional forms of treatment in the past were so discouraging as to make bladder tumor cases unwelcome in the practice of surgeons, and not infrequently they precluded conscientious surgical intervention altogether.

The fundamental and all-important consideration as to the proper treatment of the various intravesical growths, benign or malignant—whether it should be electrical, operative, or palliative—should rest chiefly with the experienced cystoscopist, although indispensable assistance will be rendered by the cystogram, the histopathologic examination of an excised section of tissue, and the patient's general physical condition. The importance of a correct differential diagnosis of these bladder growths cannot be too strongly emphasized because thereon depends the proper line of treatment.

The author summarizes his plan of treatment as follows:

1. If the tumor is a polyp, hæmangioma, or papilloma, single or multiple, the treatment *par excellence* is cystoscopic fulguration or electrocoagulation with the Ouidin or d'Arsonval high-frequency current.

2. In selected cases of early malignant tumors, especially those involving the vesical orifice, complete resection of the tumor-bearing area being impossible, it is desirable, after cystotomy, to destroy the growth by fulguration and then to implant radium in the tumor bed, employing needles, each containing 12.5 mg.

3. In cases of malignant growths favorably situated and not too far advanced, the first thought should be extraperitoneal resection or combined extraperitoneal and intraperitoneal resection of the portion of the bladder occupied by the carcinoma, one or both ureters being implanted if necessary. In the bladder, as in other organs of the body, surgical intervention for carcinoma should always be supplemented by intensive roentgen-ray crossfire.

4. In the group of cases beyond the hope of cure by radical surgical procedures in which something must be done for the relief of distressing symptoms, fresh encouragement has been given by the use of multiple needles of small quantities of radium embedded in the growth. Following the destruction of all visible and palpable evidence of diseased tissue by fulguration through the cystotomy opening the radium needles are implanted throughout the tumor bed and left in place for from six to eighteen hours.

In the series of 62 cases reported there were 30 carcinomata, 25 papillomata, 6 polypi, and 1 hæmangioma. Carcinoma occurred at all ages from 44 to 80, papilloma from 33 to 72, polypi from 38 to 77, and hæmangioma at 70. The duration of symptoms varied from two weeks to twenty-five years. Blood, pus, urinary frequency, and dysuria constituted the danger signals from the urologic tract. Forty-two patients had received only medical treatment previously for months or years and 9 had had some form of surgical treatment, usually a cystotomy with attempted removal of the growth (recurrence invariably resulted, and not in a single instance was the procedure followed by a permanent cure). In 21 cases of papilloma, from one to nineteen treatments with the high-frequency current were required to destroy the growths (in many cases

the growths were multiple), and in approximately one-half of these cases a recurrence developed from one to ten times. In only 1 of the 4 cases of carcinoma treated by fulguration was the patient benefited.

Recently the author treated the affected area in the bladder for twenty-four hours with radium inserted through the urethra following the destruction of multiple papillomata with the high-frequency current.

The implantation of multiple needles with small amounts (12.5 mg.) of radium throughout the carcinomatous mass, instead of its removal or destruction by the high-frequency spark, followed by the application of large amounts of radium (from 50 to 100 mg.) has been employed so recently that a comparison of this method with others is premature. Cases in which resection of the bladder, with or without transplantation of the ureter, is practicable and advisable are comparatively few. Total cystectomy is likewise a hazardous procedure. Thomas performed it successfully, however, in 1 case of the series. LOUIS GROSS.

Neill, W.: Further Progress in the Treatment of Tumors of the Female Bladder. *Am. J. Surg.*, 1920, xxxiv, 325.

Flat tumors with broad sessile bases the author treats by implanting directly into the growth small capillary glass tubes containing from 3 to 5 mc. of radium emanation. This treatment is not repeated under from four to six weeks. In addition, the tip of a sound containing the equivalent of 1 gm. of radium in the form of emanation rays is held upon the surface of the growth for from five to ten minutes. Simple papillomata are treated in the latter manner, the procedure being repeated once each week for four or five weeks. In applying these treatments the Kelly cystoscope is used. H. G. HAMER.

Kolischer, G.: Radium Therapy of Cancer of the Bladder and Prostate. *Am. J. Surg.*, 1920, xxxiv, 323.

The author uses only gold filters in treating bladder tumors with radium. He emphasizes the importance of preparing the bladder properly for the reception of the radium and discusses in some detail the methods employed in meeting the various complications which influence the use of radium in these cases.

As to the time the radium is applied Kolischer distinguishes between primary application, raying following electrocoagulation of the tumor, and prophylactic raying secondary to excision of the growth.

In placing radium in the unopened bladder the author uses a No. 21 silver Charrière sound with a detachable hollow gold tip 3 mm. thick into which the glass container carrying the radio-active substance is placed. If the bladder has been opened he applies the radium by dropping it into the bladder through the suprapubic opening.

Fifty milligrams of radium or mesothorium are sufficient for the treatment of vesical or prostatic tumors, the results from a dose of this size being as good as those following larger doses.

If a few radium treatments do not produce decided improvement, it is useless to continue. Resort must then be had to electrocoagulation.

H. G. HAMER

Ballenger, E. G., and Elder, O. F.: Notes on Urethral Strictures. *Am. J. Surg.*, 1920, xxxiv, 340.

A urethral stricture is caused by inflammation or injury of the urethral wall which results in a deposit of fibrous tissue and narrowing of the canal. Strictures may be congenital or due to gonorrhœa, trauma, or the injection of strong chemical agents. They may be passable or impassable.

The more common symptoms are a decrease in the size of the urinary stream, urethral discharge, irritation, and disturbed sexual life. An acorn-shaped bougie is used for diagnosis.

Gradual gentle dilatation with sounds and a Kollman dilator at intervals of from one to five days causes absorption. Over-dilation is followed by the formation of new scar tissue. Resilient strictures, strictures which do not respond to dilatation in a reasonable time, and strictures which are too extensive or too tight for dilatation are indications for internal urethrotomy in the anterior urethra.

External perineal urethrotomy is indicated in tight or resilient strictures of the deeper urethra and when infiltration or stone is present. A guide should be used if possible, but when it is impossible to pass a filiform bougie the structure may be bored through with the forefinger as advocated by Livermore or retrograde catheterization through a suprapubic opening may be done. A large retained catheter is used for ten days, with daily irrigations and later dilatation. C. D. PICKRELL.

Ravogli, A.: On the Strictures of the Male Urethra. *Am. J. Surg.*, 1920, xxxiv, 334.

After a detailed discussion of the anatomy of the male urethra the author states that for the classification and description of strictures the urethra should be considered as having three portions, a prostatic, a membranous, and a spongy portion.

Strictures are either spasmodic or the result of inflammation. A spasmodic stricture is the contraction of the compressor urethræ seen in nervous persons or occurring after operation for hæmorrhoids and is not permanent. Filiform bougies will increase the irritation, while a good-sized catheter will pass easily. Hot sitz baths, opiates, and later dilatation to prevent recurrence are of value in the treatment. Silver nitrate 1:1,000 will decrease the sensitiveness.

The wide-caliber stricture of Otis consists of a contracting peri-urethral formation of fibrous tissue following the absorption of infiltration deposited in the submucous layer during inflammation. The

lumen of the urethra is not narrowed. When the infiltration heals and scar tissue forms, narrowing of the lumen results.

In a series of 320 cases reported by Thompson 54 strictures were between the meatus and a point 2½ in. above it on the pars pendula; 51 were in the middle of the pars pendula; 216 were in the subpubic curvature in the bulb and the membranous urethra. Increased vascularity and the urethral curve favor the latter regions. The abundance of follicles in the bulbar region favors exudation. The membranous urethra favors traumatic stricture.

According to Thompson and Martin, gonorrhœa causes from 75 to 85 per cent of all strictures. The others are traumatic.

A long-standing gleet, morning drop, shreds, symptoms of posterior urethritis, irritable bladder, frequency, frequent erections at night, and impotence are present in various degrees. The urinary stream decreases in size and force and may be divided or twisted. Pain may be present, either at the beginning or the end of urination or may be spasmodic. Alcohol or excessive intercourse may cause retention. Urethral dilatation, extravasation, abscesses, fistulæ, cystitis, ureteritis, and pyelonephritis are possible complications.

The prognosis depends upon the nature and location of the stricture. Traumatic strictures contract rapidly, while gonorrhœal strictures contract slowly. Those in the perineal urethra are more difficult to treat than those in the pars pendula. A first-stage stricture is more easily dilated and more permanently cured than a second-stage stricture. Death may follow extravasation, abscess and gangrene formation, chronic uræmia, cachexia, etc.

The treatment consists of gentle and clean instrumentation. Dilatation should be gradual and accompanied by gentle massage. The author relies more upon sounds than upon a dilator. In tight, resisting strictures filiform bougies, soft rubber bougies, and electrolysis are used instead of steel sounds which may cause damage by tearing. Radium has been employed by Ayres with poor results. Cutting gives only temporary relief. External urethrotomy is indicated in impassable strictures. Instrumentation is followed by irrigation, Internal antiseptics are of value. C. D. PICKRELL.

GENITAL ORGANS

Kuemmell, H.: The Two-Stage Prostatectomy for the Cure of the Most Severe Forms of Prostatic Hypertrophy and Renal Insufficiency (Die zweizeitige Prostatektomie zur Heilung der schwersten Formen der Prostatahypertrophie und Niereninsufficienz). *Berl. klin. Wchnschr.*, 1920, lvii, 485.

Both methods of prostatectomy, the suprapubic and the perineal, have their advantages and disadvantages. The suprapubic method seems to have a higher mortality, but according to French authors improves potency and function so that the patient rejoices in a second youth.

The perineal method frequently causes incontinence and injury to the ejaculatory ducts. From 35 to 50 per cent of persons with prostatic hypertrophy who are not operated upon die of general cachexia, urosepsis, and especially of secondary renal disease. The latter is demonstrable by cryoscopy of the blood and the quantitative determination of indican in the blood.

To prevent the danger of renal insufficiency the author recommends the two-stage suprapubic method. Of 28 patients between 57 and 83 years of age operated upon by Kuemmell according to these principles all were cured except 1, an 80-year-old patient who died of pulmonary embolism three weeks after the second operation when the wound had entirely healed.

In the cases reported the secondary kidney insufficiency was overcome in from ten to fourteen days by the formation of a high bladder fistula and the cystitis was cleared up by irrigation. Twenty-four hours before the second operation the fistula was dilated by means of laminaria tents so that it was possible to introduce at least two fingers into the bladder to shell out the prostate. Before this, a retention catheter was introduced into the bladder. After direct injection of novocaine solution into the prostate and its surroundings the median lobe was pulled toward the wound by the left index finger which was inserted into the rectum and the prostate was shelled out with the right forefinger introduced into the funnel-like opening of the urethra. A retention catheter was then inserted and the bed of the prostate was tamponed loosely. An Irving capsule and a retention catheter introduced into the bladder fistula prevented soiling with urine and allowed the patient to get up soon after the operation. After two weeks the fistula which had been formed by suturing the vesical mucosa to the skin was freshened under local anæsthesia and closed secondarily. The dilatation of the vesical fistula by means of laminaria tents is painless. The operation described is well tolerated. JASTRAM (Z).

Swartz, E. O., Shohl, A. T., and Davis, D. M.: Certain Cultural Characteristics of the Gonococcus. *Bull. Johns Hopkins Hospital*, 1921, xxxi, 449.

As a result of studies made in the Johns Hopkins Hospital regarding the action of disinfectants on the gonococcus cultivated according to the method described by Swartz, the authors found it desirable to investigate its cultural characteristics.

Investigators have been generally in agreement upon certain points, but have differed regarding others. Thus the sugar reactions of the gonococcus and the morphology of its colonies were found by different workers to be the same. On the other hand, a number of quite different reactions have been recommended as the most suitable for the growth of the gonococcus, and while all have found the organisms to grow better in closed systems, the authors considered it doubtful whether this differ-

ence was due to lowered oxygen tension, increased carbon dioxide tension, a change in reaction due to carbon dioxide, or the abundance of moisture. The assumption that the gonococcus accustoms itself to plain media and becomes Gram-positive the authors consider very important, if true.

They generally followed these lines in their work, attempting also to determine for the gonococcus grown in sugar media an acid death-point like that described for the bacillus coli by Michaelis, Marcora, and Bruenn.

One strain of gonococcus in their series showed a very slight growth consisting of a few isolated colonies after being transplanted several times on the usual medium and then transplanted to plain agar containing no uncoagulated protein. A second transfer produced no growth. Aside from this instance, the organisms did not grow on plain media, either when freshly isolated or after many subcultures in the laboratory.

On solid media isolated colonies of the gonococcus which developed under unfavorable conditions of growth such as a too-high oxygen tension or the presence of small quantities of some germicidal substance presented the same appearances as those described by Martin and others. A translucent gray color by reflected light changing to a fairly clear light brown by transmitted light was found by them to be characteristic.

On liquid media consisting of two-thirds beef or veal infusion bouillon and one-third ascitic or hydrocele fluid the gonococcus grew well when the oxygen tension was lowered. After many subcultures some of the strains grew with less profusion on solid media and showed many involution forms. When such a strain was passed once or twice through liquid media the original profusion of growth was restored and the involution forms diminished.

The usual media used by the authors had a reaction of pH 7.4. It was found that the presence of moisture in the culture media was desirable, and indeed necessary, for profuse growth.

In order to determine the acid death-point for the gonococcus, cultures were made in liquid media containing 1, 2, or 3 per cent dextrose. After ten days' incubation all growth had ceased and there were no more living organisms. Hence, after the tubes had been left in the incubator for at least ten days the acidity of the media was tested colorimetrically and electrometrically.

The acid death-point determined for gonococci grown in dextrose ascitic fluid bouillon was found to be pH 5.6, the variations mentioned in the quantity of dextrose present making no difference. The gonococcus always produced acid when grown on its ordinary ascitic or hydrocele fluid beef or veal infusion agar, the final pH being 6.2. This medium was not especially rendered sugar-free, but contained no reducing substance for Fehling's solution.

From their study the authors draw the following conclusions:

The better growth of the gonococcus in closed systems, when part of the air or of the oxygen had been removed or replaced, was due essentially to the lowered oxygen tension, and not to moisture, change of reaction, or the presence of carbon dioxide.

Moisture was necessary for good growth.

A reduction in the oxygen tension of 10 per cent was sufficient to produce optimum growth.

If the oxygen tension was suitable and moisture and uncoagulated proteid were present, the gonococcus grew luxuriantly on media having an initial reaction anywhere between pH 6.6 and pH 8.0 inclusive.

In dextrose-containing media the acid end-point for the gonococcus was pH 5.6. G. E. Beilby.

SURGERY OF THE EYE AND EAR

EYE

Aránguez, M. E.: The Treatment of Blepharoptosis (Tratamiento del blefaroptosis). *Pediat. espan.*, 1920, ix, 246.

Ptosis is caused by paralysis of the levator muscles of the eyelid due to arrested development or congenital deformity. The method of treatment may be surgical or non-surgical. Non-surgical treatment, however, has proved unsatisfactory. This is true as regards syphilitic treatment, electrical stimulation of the eyelid, and the use of mechanical devices to hold the lid relaxed as in the normal.

The object of all operations has been to retract the drooping, thus completely exposing the eyeball. In some operations the lid is shortened by the removal of skin flaps; in others, by fixation or suspension of the levator muscles of the eyelid; and in others, methods of fixation and shortening may be combined. The author points out which operations are best suited for certain types of ptosis. The operation preferred was devised by Motais in 1897 and consists of the transference of a longitudinal flap of the superior rectus muscle into the integument of the eyelid. Marquez later modified this operation by substituting one-half of the tendon of the muscle for the muscle itself. This operation requires a great deal of skill and sometimes fails to accomplish its purpose.

To obviate the difficulties of technique in Motais' operation, the author has devised a procedure whereby the levator palpebrum muscle is sectioned and fixed to the superior rectus orthe levator is merely fixed without being sectioned. The levator palpebrum muscle lies on the same vertical plane and just above the superior rectus; both are supplied by the third cranial nerve. The upper lid is retracted with a sharp one-prong retractor. A horizontal incision 1 cm. long and 7 mm. above the corneal margin is made on the sclera, a similar incision is made on the conjunctiva of the upper lid, and both are joined at the middle by a third vertical incision. When the lid is retracted upward and the eyeball downward the superior rectus is exposed. The tendon of the levator is then fixed near its insertion by strong sutures to the superior rectus as far back from its insertion as possible. After the tendons are firmly fixed the levator may or may not be cut.

The technique of the author's operation is much simpler than that of Motais. The strong active muscle (superior rectus) is not affected whereas in Motais' operation the tendon is divided. There is no danger that suture material will rub against the cornea and both tendons of the levator are preserved and functionate. In Motais' operation only the inferior tendon is used. The two contra-indications to the author's operation are: (1) paralysis of both the superior rectus and the levator muscles, and (2) congenital absence of the levator.

PIO BLANCO.

Scalinci, N.: The Medical Treatment of Incipient Cataract (La cura medica della cataratta incipient). *Riforma med.*, 1920, xxxvi, 854.

The author reviews the various medical treatments to restore the opaque lens to its normal transparency, especially the use of iodine preparations in cases of incipient cataract. Iodine is efficacious particularly in incipient so-called "senile" cataract which the author prefers to term "dyscrasic" or "diathesic" cataract because of the physiochemical constitution of the lens and the relation of this type of cataract to changes in the organic metabolism inducing acidosis. Local applications of iodine pass into the interior of the eye.

The author uses a solution of sodium or potassium iodide to bathe the eye or for subconjunctival injections.

The type of cataract which is treated best by local applications of iodine is the primary cataract, especially that of the dyscrasic or diathesic type. The best results are obtained when the change in the lens is at its beginning. Certain diathesic cataracts, more especially those associated with glycosuria and more or less marked variation in refraction, are treated very advantageously with iodine. The lenticular opacity is attenuated even if it does not disappear.

The results reported by the majority of those who have carried out systematic iodine treatments in cases in which the vision varied from 1/6 to 1/3 showed an improvement up to 2/3 after several months of treatment.

The author draws attention to the necessity for supervising the patient's general condition as sometimes an underlying cause for the ocular lesion will be found in a disturbance of the general system. In this regard opotherapy has given results which are worthy of consideration. W. A. BRENNAN.

Carreras: A Rare Form of Cataract from Contusion (Una forma de catarata traumatica por contusion). *Med. Ibera*, 1921, xiv, 39.

Carreras presents a rare case of contusion cataract simulating in appearance a bluish-white cyst of the iris. This proved to be a cystic swelling of the lens substance through a small tear in the lens capsule.

Its formation was due to the fact that the traumatic iritis and torn lens capsule effectively blocked off the remainder of the lens by adhesions. Thus

only the lens substance over the tear became hydrated and swollen. The correctness of the diagnosis was proved at operation.

F. P. SCHUSTER.

Barraquer, I.: Cataract Extraction (Sobre facoerisis). *Siglo med.*, 1920, lxviii, 21.

Barraquer describes a method of intra-capsular cataract extraction by means of a pneumatic suction-vibratory apparatus which grasps the anterior surface of the lens and vibrates it until the zonular fibers of the capsule are torn and then withdraws the lens.

He goes into the physics of tension and elasticity, showing that in senile cataract the zonular fibers are inelastic and when the capsule is made tense by the vacuum cup-like end of the instrument, short and rapid vibratory movements, produced and regulated by the pneumatic apparatus, tear the zonular fibers easily. The character, amount, and amplitude of the vibrations must be varied according to the type and age of the cataract, this being determined before the operation by studying the case under wide dilatation with strong illumination and a binocular loupe. The stages in the operation are described as follows:

After the usual preparation and with maximum dilatation, an incision involving two-fifths of the corneal circumference is made. This incision comes out somewhat in the sclera so that as large a conjunctival flap as possible is made. Following a Hess peripheral iridectomy, the vacuum-cup end of the apparatus described is slipped gently into the anterior chamber, behind the iris into the posterior chamber, and onto the middle of the anterior surface of the lens. Suction is then begun. The capsule being now in the grasp of the suction cup, the zonular fibers are thus made tense and are ruptured as the instrument is vibrated. The lens follows the gentle withdrawal of the instrument. The usual toilet of the wound is then carried out.

S. A. SCHUSTER.

Walker, C. B.: Nasolachrymal Surgery in Ophthalmological Perspective. *Arch. Ophth.*, 1920, xlix, 585.

Walker predicts that the formation of a nasolachrymal fistula will become the operation of election for a definite group of cases because it may be done without ether, without pain, and without an external incision, while the possibilities of functional result are equal or superior to those of sac extirpation.

The principle of fistulization is the same as in other regions of the head. Closure of the fistula must be prevented by making a simple circular opening with a spherical burr.

A very perfect anæsthesia may be obtained by applying cocaine-mud to the nasal wall opposite the sphenopalatine ganglion and at the anterior extremity of the cribriform plate.

Among cases recently reported the operation was successful in about 80 per cent and a failure in 10 per cent.

Cases of dacryocystitis fall into two groups, acute and chronic. In the acute phlegmonous type, in which external incision is necessary, an opening into the nose is made through the incision with a chisel, punch, or burr, and enlarged to its maximum size. A probe is then passed into the sac and the portion corresponding to the central portion of the bony opening is excised. Following this excision, a small gutta-percha cigarette drain is pushed into the nose through the sac to insure drainage, and the external wound is closed.

Chronic cases are approached intranasally by uncapping the lachrymal sac immediately in front of the attachment of the middle turbinate, then pushing the sac into the nasal chamber by means of a probe pushed through the uncut puncture, and excising as much of the tent thus produced as possible.

For the operation described Walker has devised a special chisel and a spherical burr with a guard.

Chronic catarrh, ethmoiditis, and catarrhal deafness are the chief complications and raise the percentage of operative failures because in these conditions keloid-like, raised scar tissue tends to form about the opening.

From observations of the process of healing by means of the nasopharyngoscope, it does not seem that a plastic flap operation would necessarily be of much value in preserving the fistula.

F. P. SCHUSTER.

Bookwalter, C. F.: Intranasal Dacryocystostomy. *Arch. Ophth.*, 1920, xlix, 568.

Bookwalter describes his method with very clear illustrations. His conclusions are:

The results of the operation are ideal if the opening is made large with smooth edges and treatment is carefully carried out to prevent excessive granulation until healing is complete.

Suppuration is invariably relieved.

There is no tearing even if the canaliculi are in only fairly good condition.

It is much better not to slit the canaliculi.

The most unfavorable occurrence after operation would be the closure of the opening. Even when this happens, however, either a secondary intranasal operation or an external operation is possible.

Considering the structures involved in the operation, it is difficult to comprehend how a serious complication could arise.

T. D. ALLEN.

Moodie, A. R.: Two Cases of Double Glioma Retinæ. *Brit. M. J.*, 1920, ii, 856.

The first case was that of a healthy appearing child 12 months of age. Six months previously he became "different" and the mother noticed that he had a "glide." Two weeks before admission she observed a white speck in each pupil. There was concomitant convergent strabismus of the right eye.

Both anterior chambers were shallow. The right pupil was dilated and unequal and reacted slowly to light. In both eyes a whitish tumor was visible on oblique illumination. The eyes were removed under ether on consecutive days. Pathologic examination showed the growth to be a typical glioma retinæ with well-developed rosettes.

The second case was that of a child 3 months of age. The mother had noticed that "both eyes were glassy" for five days before the patient's admission to the hospital. At examination, both anterior chambers were found to be shallow, and the pupils were dilated and inactive. A large whitish vascular tumor could be seen in each eye. Tension was increased in both eyes.

The operative treatment was the same in both of these cases. Microscopic examination showed the tumor in both eyes of each patient to be a glioma retinæ with considerable necrosis. In general, the growth was sarcomatous with a perithelial arrangement of the cells.

The prognosis in this condition depends on early diagnosis and immediate surgical treatment. If the affected eye is removed before perforation has occurred the prognosis is fair, but in the absence of operation or the presence of recurrence it is practically hopeless. There was no sign of extra-ocular extension of the growth, and six months after the operation both children were entirely well.

MERLE R. HOON.

Herbert, H.: Small-Flap Sclerotomy (Rectangular Flap Sclerotomy). *Brit. J. Ophth.*, 1920, iv, 550.

Herbert discusses the factors which cause permanent increased tension in glaucoma and the manner in which these are overcome by operative procedures. He speaks of the anatomy of the scar in operations on the iris and following the small-flap sclerotomy. He mentions particularly which kinds of glaucoma are most amenable to sclerotomy—those in which the tension is not very high and those in which a moderately high tension has not persisted for a long time. He urges the use of miotics for several weeks preceding the operation if the tension is above 40. T. D. ALLEN.

Vail, D. T.: Detachment of the Retina. *Arch. Ophth.*, 1920, xlix, 553.

Vail states again a theory of his own regarding the etiology of detachment of the retina which he published first in 1912 and continues to hold. Statistics in Wood's encyclopedia show that myopia was the apparent cause of detachment of the retina in less than 50 per cent of 300 cases. Moreover, in many cases of myopia in which there are large sclerotic walls detachment of the retina does not occur, whereas in many cases of hyperopia in which the eyes are small it does occur.

As regards trauma as a cause, Vail mentions the fact that detachment of the retina follows severe intra-ocular trauma such as that associated with large vitreous loss in cataract extractions in less than 5 per cent of cases. He quotes from his previous paper his theory that there is a paralysis of the secretory function of the ciliary processes which leads to a reduction in the tension because the watery elements find ready egress. The withdrawal of normal tension causes a passive hyperæmia of the blood vessels of the choroid and allows diapedesis and transudation. As the vitreous loses its watery condition it contracts, thus drawing upon the retina, and the transudation beneath the retina pushes upon it and causes retinal detachment. This is a combination of the well-known contraction theory and the diffusion theory.

As a possible cause of paralysis of the secretion of the aqueous, the author mentions anterior choroiditis and gives facts supporting this view. He discusses clearly the mechanism of aqueous secretion and shows how this agrees with his own ideas. He suggests the use of pilocarpine to promote the flow of aqueous and states that possibly there is a relationship between its action and that of the normal hormone producing the same result. T. D. ALLEN.

Thomson, E. S.: Further Experiences with Trephining and Aspiration in Retinal Detachment. *Arch. Ophth.*, 1920, xlix, 563.

Thomson gives the history and results in 7 cases of retinal detachment treated successfully by trephination and aspiration. These were the only successful cases among 75 treated in this manner. The detachment dated from a few days to seven months. In 2 cases the trephining was done first and the aspiration ten days later; in the others the two operations were performed at the same time.

A large conjunctival flap was dissected and a 2-mm. trephine was passed through the sclera as far back as possible over the area of detachment. With an electric ophthalmoscope, the needle of a syringe was introduced through this trephine opening, well back into the middle of the area of detachment, and all of the fluid beneath this area was withdrawn. If the fluid is not entirely withdrawn the operation is almost sure to be a failure.

An interesting observation was that the retina does not lose its function as rapidly as has been supposed. In the case in which the detachment had been present for seven months vision was completely regained although a blur remained in the field for several months after the operation. Thomson states that an immediate increase in function is noticed when the retina is replaced, providing perception of light in the detached retina had not been lost.

The larger the amount of fluid, the more slender the chances of success. Marked vitreous opacities are a distinct disadvantage. The tension does not remain permanently lowered after the operation but returns to normal after a few weeks. Infection at the site does not occur as when trephining is done at the limbus, probably because of the greater thickness of the conjunctival flap. If the retina is disposed to adhere it is a mistake to overdo the period of rest in bed; ten days is ample. T. D. ALLEN.

EAR

Friel, A. R.: Zinc Ionization in the Treatment of Local Sepsis. *Med. Press*, 1920, n. s. cx, 431.

The author describes certain experiments which show the reasonableness of treating local sepsis by zinc ionization, enumerates the principal conditions which must be fulfilled in order to obtain successful results, and considers the position zinc ionization may occupy among the various methods of treating local sepsis.

Zinc ionization causes the coagulation of albuminous bacterial and tissue cells, and hence their death. This action depends upon the fact that when a salt is dissolved in water it is partly split up into ions which are the electrically charged basic and acid radicals. The basic radicals, which include all metals, are positively charged and the acid radicals, such as chlorine, iodine, salicyl, sulphuric, nitric, etc., are negatively charged. If two wires, one connected to the positive terminal and the other to the negative terminal of a galvanic cell, are dipped into the solution, the electric current from the cell moves the positive ions, such as zinc, silver, and copper, toward the wire connected to the negative pole, and moves the negative ions, such as chlorine, salicyl, etc., toward the wire connected with the positive pole.

The quality of response of living tissues to a stimulus depends upon the size of the dose. This is true also of zinc ionization and can be shown by ionizing an area of healthy skin. It will be found that a short ionization with a weak current will result in hyperæmia, while a long application will result in necrosis.

The septic areas treated in practice may be divided into two types as regards the structure of the surface affected: (1) those in which the sepsis involves the skin and mucous membrane, and (2) those in which it is formed of tissue such as granulation tissue covering an ulcer or a pyogenic membrane forming the wall of an abscess. If the area to be ionized consists of skin or mucous membrane, care is necessary, whatever ion is used, to see that the dose is moderate as otherwise necrosis will result. The most usual position in which this most undesirable complication occurs is not in the area treated, but at the point where the indifferent electrode is applied to complete the circuit.

The effect of zinc is to destroy by coagulation, but when other ions such as sodium, hydrogen, hydroxyl, and salicyl, enter the skin in large quantity they will so alter the constitution of the cells as to cause their death. To prevent this, the indifferent electrode should be made as large as possible so that the current will be diffused over a large area.

In ionizing an abscess cavity or an ulcer the aim is to coagulate a layer over the whole surface and thereby render the ulcer or abscess sterile.

As to the dose necessary to sterilize a cavity or ulcer, the author states that the following have been found appropriate: middle ear, 3 ma., six minutes; maxillary antrum, 20 ma., ten minutes; sphenoidal sinus, 7 ma., ten minutes; and frontal sinus, 10 ma., ten minutes.

There are two methods of determining the suitable dose. One, the empirical, consists in giving doses in a series of cases until it is discovered which amount gives the best clinical result. The other method, which is more accurate, consists in giving a dose with a definite immediate object, and when this object is attained, e.g., the sterilization of a surface, observing whether this sterilization is attended by the clinical results desired, namely, cessation of suppuration in a septic case followed by rapid repair.

In treating a septic cavity with irregular prolongations in the soft parts an equal dose of electricity must be delivered to each square centimeter of surface. To make this possible the prolongations and the central cavity must be converted into one large cavity or a wire suitably protected from contact with the tissues must be introduced into each prolongation.

Ionization is not strictly a method of treating disease, but a method of treating one of the factors of disease—septic infection. It has its definite place, and when the conditions for its application are present and it is applied with care and thoroughness, the results are excellent. O. M. ROTT.

Baylor, J. W.: Restoration of Hearing in a Case of Gunshot Injury of the Eustachian Tubes. *Bull. Johns Hopkins Hospital*, 1921, xxxi, 454.

Many of the technical difficulties of an examination of the ear, nose, and throat have been removed by the introduction of electrically lighted instruments. The nasopharyngoscope is especially valuable for the diagnosis of infections of the posterior ethmoidal and sphenoidal sinuses and for inspection and treatment of the eustachian tubes. Baylor does not consider the use of the nasopharyngoscope essential for the diagnosis and treatment of the majority of cases, however, as it is only by constant practice that sufficient skill is acquired to use it to advantage in cases which could not be treated by the ordinary methods.

For the past five years Baylor has used a nasopharyngoscope in the examination of all nose and throat cases and in the treatment of all eustachian-tube conditions. To this fact he ascribes the successful outcome in the case of one of his patients, aged 28, white, who was admitted to the Johns Hopkins Hospital February 20, 1920, complaining of deafness in both ears due to a gunshot wound received two years previously. The bullet from a 38-caliber pistol had entered the right side of the face 1 cm. in front of the tragus at the lower border of the zygoma and had passed downward at an angle of about 35 degrees. A temporary facial palsy and a subjective hemi-anæsthesia on the right side developed. Immediately after the accident the patient was confined to bed in a hospital for three weeks. No attempt was made to remove the bullet. Hearing was subjectively normal during

this period. A short time later some impairment of hearing in the right ear was noted, and in six or seven months this had progressed to almost complete deafness. A discharge from the left ear had persisted for two or three months. This did not appear until four weeks after the injury and was not associated with earache. Hearing gradually became impaired on this side also, but to a less degree than on the right. On the patient's admission to the hospital there was no discharge from either ear. The drums were retracted and thickened.

On February 24 the patient was anæsthetized and placed in the Trendelenburg position. The soft palate was retracted by means of small rubber catheters passed through each nostril and brought out through the mouth. The tissues of the nasopharynx were infiltrated with procaine and adrenalin to control bleeding partially and to diminish the reflexes which invariably occur during operative procedures in the nasopharynx.

Even under direct vision the orifices of the eustachian tubes could not be recognized. The scar tissue was removed by sharp dissection and with sharp nasal rongeurs. The bleeding was controlled whenever possible by the introduction of catgut sutures. The nasopharynx was not packed.

The postoperative course was uneventful until the fifth day when bronchopneumonia developed on the right side. The patient was therefore transferred to the medical service. There he remained until March 28, at which time he had completely recovered. Nothing was done to the nasopharynx during this period except that it was frequently irrigated with sterile normal salt solution followed by the introduction of sterile albolene into each nostril. During the next three months about three hours a week were devoted to the localization and dilatation of the eustachian tubes. After three months of treatment the hearing in the right ear still remained slightly impaired and bone conduction was a little better than air conduction. With this improvement in hearing there was no appreciable change in the appearance of the tympanic membrane on either side. It seemed possible to the author that the scar tissue might ultimately contract and again produce stenosis, but he believed that subsequent treatments would not be more difficult than in ordinary strictures of the eustachian tube. The point emphasized in this article is that it would have been impossible to benefit this patient in any way without the use of the electrically lighted nasopharyngoscope.

G. E. Beilby.

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